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MAY • 1953

American Fruit Grower

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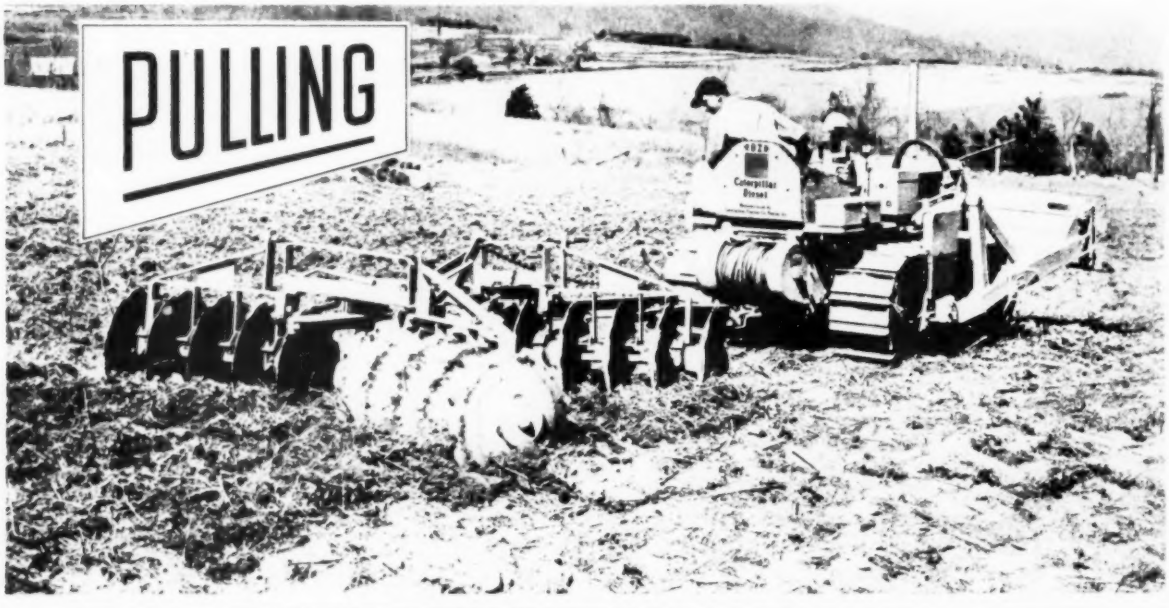

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CONTENTS

Commercial sweet cherry production is concentrated in the five far western states while tart cherries are produced commercially in New York, Pennsylvania, Ohio, Michigan, and Wisconsin, with Michigan producing the bulk of the tonnage. Photograph is by Gladys Diesing.

AMERICAN FRUIT GROWER
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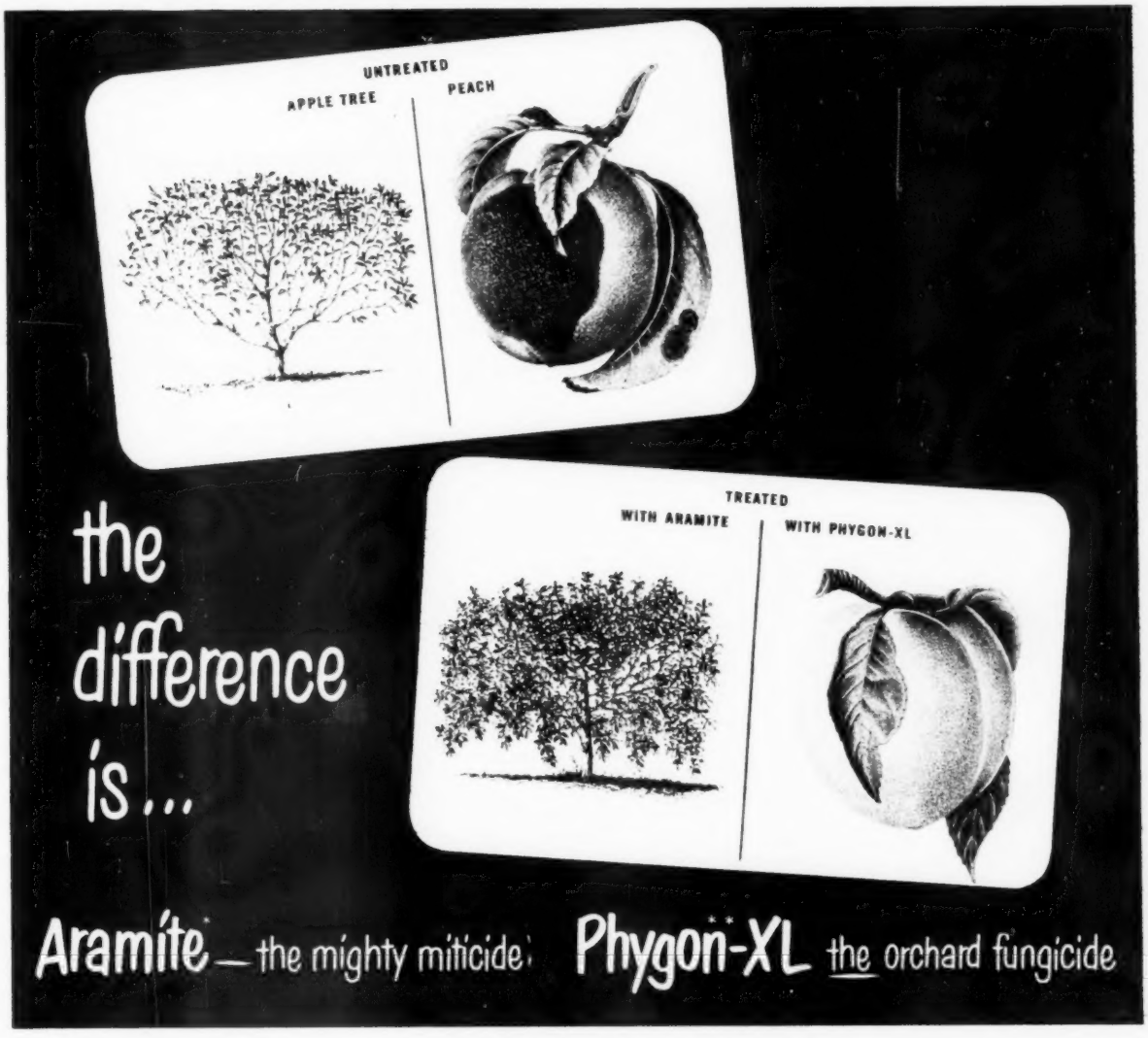

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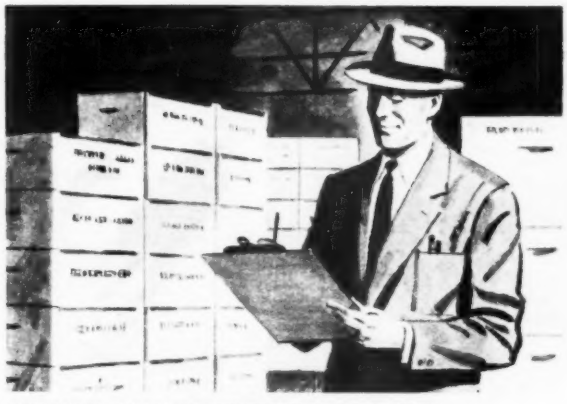

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LETTERS TO THE EDITOR

Warns Against Toxaphene for Mouse Control

Dear Editor:

Within recent months there has been considerable publicity on the use of toxaphene to control meadow mice in orchards, hay, and other field crops. The use of toxaphene and other chlorinated hydrocarbon insecticides applied as a blanket spray to the ground cover for the control of small rodents is under investigation by the U. S. Fish and Wildlife Service and state agencies. Procedures still are in the research stage, and the method should not be used for rodent control at this time.

The effectiveness of toxaphene in controlling meadow mice varies with the density of the ground cover and the amounts of toxaphene employed per acre. Field results to date have been very erratic. Currently, large amounts of toxaphene per acre are being used experimentally. At this rate of application a serious hazard exists to game birds, domestic poultry, and livestock that may enter sprayed areas.

The Fish and Wildlife Service recommends that until research investigations have been completed and appropriate recommendations formulated, no toxaphene or any other toxic insecticide be used as a ground spray for rodent control.

Fish and Wildlife Service
Washington 25, D.C. Dorr D. Green

Corn Cob Mulch Unsatisfactory for Young Trees

Dear Editor:

In the article "Your Young Orchard," which appeared in a recent issue of AMERICAN FRUIT GROWER is a photograph taken in our orchard showing the use of heavy corn cob mulch on young apple trees.

This experiment proved unsatisfactory. The trees grow fast and look well until they come into bearing, at which time it becomes apparent that the root system has developed too near the surface and provides insufficient anchorage to hold the trees upright under a load. We have lost practically all of our trees that were mulched heavily with corn cobs from the time they were planted. Experience has shown us that a light mulch of any kind—just sufficient to keep down competing weed growth—develops a sturdier rooted tree.

Heavy corn cob mulching continues to give good results on our mature apple trees, many of which have been so managed for more than 15 years. Our orchard is on a heavy clay soil with impervious subsoil which is wet in spring, droughty in summer. Heavy mulching makes high yields possible and corn cobs were the material available.

New Madison, Ohio Ernest J. Downing

Thoughts on Apple Marketing

Dear Editor:

A number of years ago the housewife depended on apples almost entirely for her supply of fresh fruits during the winter. But today, with plenty of other fruits and vegetables on sale the year around, the consumer has a choice, and if apples do not look appealing she does not have to buy them. It is easy to see then that in order to increase the sale of our apples we must produce fruit of the highest quality.

One very encouraging aspect as we look toward the future is the growth in apple processing. We must increase our interest in marketing, promotion, and advertising. The consumers are close to us, and it is up to us to take advantage of this by supporting our regional organizations and by doing everything we can to promote and to sell our apples.

Hammonton, N.J. James Shoemaker

Russet Promoter

Dear Editor:

About a year ago I sent you a letter saying I had Russet apple trees and would send grafts to any who wanted them. Letters began pouring in, and this week I sent grafts to California, the 56th request.

The man who sowed the seed was the grandfather of the man who founded our

town. I do not know the date, but it is said to be around 1830. The trees bear profusely with no trouble from diseases.

Pemberville, Ohio Mrs. H. E. Ward

Danish Grower Keeps Up-To-Date

Dear Editor:

For a number of years I have been a regular reader of AMERICAN FRUIT GROWER. I want to sincerely thank you for the many different items of interest which your magazine in these many years has given me, even though fruit growing in America is quite different from the way it is practised here in Denmark.

My interest in fruit growing started as a hobby when I planted some 100 fruit trees in the garden adjoining my country house near Kolding, Denmark, 18 years ago. Since that time my hobby has developed into an orchard, and I now have around 10,000 apple trees covering around 50 acres. For the last eight years I have given all my time to this project.

My object in becoming an orchardist has been to prove that the way to economic success in fruit growing must be to make use of all possible scientific knowledge plus technical improvements.

Not only the net profits, but also the constantly increasing number of visitors from almost every European country seem to justify that we are on the right track.

Thank you again for the pleasure and inspiration AMERICAN FRUIT GROWER always give me.

Kolding, Denmark G. Lind

NOW! Completely new FORD TRUCKS for '53

Scores of brand-new, TIME-SAVING features in the completely new Ford Trucks for '53 add a new dimension to truck economy. And you can choose from over 190 models in a greatly expanded line.

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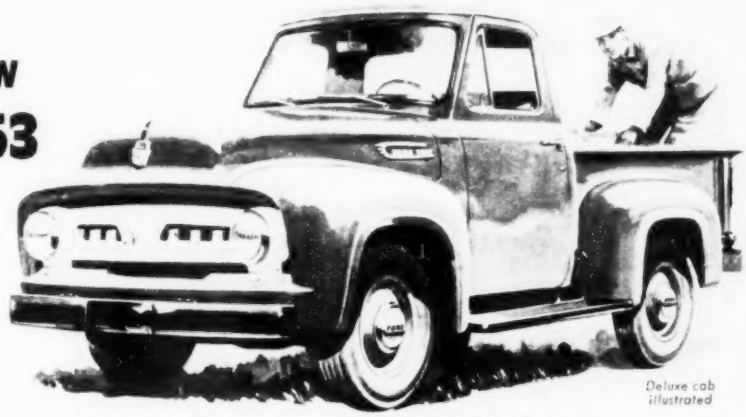

Deluxe cab illustrated

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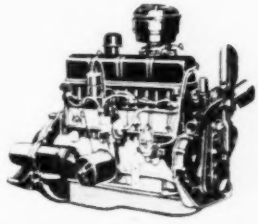

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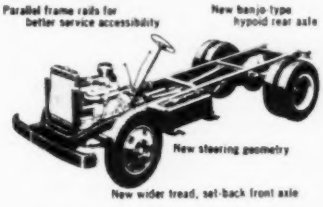
NEW SPRINGS! NEW BRAKES! Longer front and rear springs for easier ride, longer life! New self-energizing brakes for better control . . . double-cylinder type on new Ford Truck Series 500 and 600.



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The name Ashbourne has long been associated with the breeding of Shorthorn beef cattle. Ashbourne of England was the home of a family famous in the furtherance of this breed. Then Gov. Shallenberger, whose mother was of this English family, gave the Ashbourne name to his Nebraska Shorthorn farm. When he died, the name was brought to Kentucky by his granddaughter and given to the Shorthorn breeding farm owned by her husband, Mr. W. L. Lyons Brown. Thus, Ashbourne Farms acquired its name.

Shorthorn cattle from this farm have been consistent winners in State, National and International Livestock shows. The herd consists of 250 head of beef cattle and a hundred head of dairy stock. Ashbourne was one of the pioneers of the now popular "Cow and Calf Plan". The farm also raises sheep and hogs and has a poultry operation of from 1200 to 1600 birds. It supplies Ashbourne Inn with much of its meat, poultry, and vegetables and with peaches and apples from the farm's fine orchards.

Raymond Wilborn, Farm Manager, says—"We use Champion Spark Plugs in all of our equipment. They stand up better and keep our engines running smoother. That's particularly true with the air-cooled motors in our balers, conveyors, sprayers and the like that normally run at higher temperatures. We've found that Champions are the best spark plugs for these engines."

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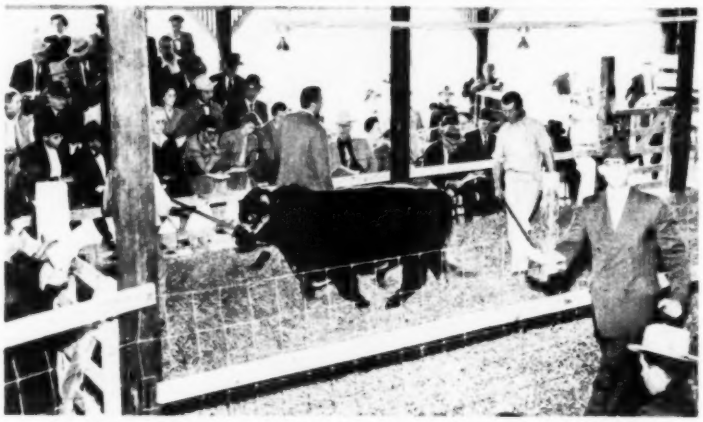
Part of Ashbourne's Champion-equipped fleet of farm vehicles.

—Says Raymond Wilborn (L.) Mgr., Ashbourne Farms, La Grange, Ky., shown here with Kendall Keller, Herdsman, and Mr. James A. King, Gen'l Mgr., W. L. Lyons Brown Enterprises.

Historic Ashbourne Inn, on U.S. 42, east of Louisville, is owned and operated by the Browns. Ashbourne meals and overnight accommodations are a delight.

This Sni-A-Bar Randolph Get-of-Sire, winner of First Prize at the 1952 International Livestock Show, was undefeated at the Ohio, Indiana, Kentucky and Tennessee State Fairs, the Mid-South Fair and the Eastern National Show.



"The Browns of Kentucky" annual sale is an outstanding event among Shorthorn breeders. Ashbourne Farms' new 3400 sq. ft. auction building of Reynolds aluminum corrugated sheeting required only 400 man hours to construct.

American Fruit Grower
• Fruit for Health •

Growth Regulators
A NEW HORIZON FOR FRUIT GROWERS

By H. B. TUKEY

THE discovery and development of growth regulators is one of the most significant milestones in the history of horticulture.

A little more than a hundred years ago it was shown that the effects of castration could be overcome in chickens by implanting testes tissue. Apparently something was secreted into the chicken from the testes which moved some distance in the individual and which produced an effect upon other parts. In 1935 this material, testosterone, was isolated and later produced artificially. When injected into hens, it caused them to assume male characteristics and even to attempt to crow.

For substance of this kind the word "hormone" was coined, derived from the Greek words meaning "I arouse to activity." A new classic example of a hormone is insulin which is secreted by the pancreas of animals into the blood stream, by which it is transported to the muscles and the liver, enabling these parts to utilize the sugar in the blood. Once isolated and identified chemically, insulin was synthesized in the laboratory and is now commonly employed in the control of diabetes.

Although the idea of hormones was thus well established in animal physiology by at least 1910, the development in plants was much slower. However, a German scientist working in Java had found in 1909 that a water extract of orchid pollen when applied to an orchid flower would cause the ovary to swell and the flower to fall just as when an apple blossom is pollinated and fertilized.

Little by little, largely during the 1920's and almost exclusively in European laboratories, the story was unfolded, showing that a substance or substances were present in plants as well as in animals which were hormone-like in action and which induced bending and various other responses in plants. These materials were variously called "Wuchstoff," "auxin," "heteroauxin," and "growth substances." Finally one of the principal materials was extracted, analyzed chemically, and found to be none other than 3-indoleacetic acid.

One of the first applications of the discoveries with growth regulators was the development of a theory which attempted to explain movement in plants, such as orientation towards a source of light, upward growth of a horizontal shoot, and downward growth of a root. The theory was based on the fact that a growth regulator is manufactured in the growing tip of the shoot and moves downward, causing elongation of cells. When the distribution of this material is equal on all sides, elongation is symmetrical; but when distribution is unequal, growth is unequal and various curvatures occur.

Thus when light is directed at a growing tip from one direction, the material accumulates on the dark side, causing greater elongation of cells in that side with resultant "bending" of the shoot towards the source of light. When a shoot is placed horizontally, the regulator tends to accumulate on the underside resulting in greater elongation of cells on that side and upward growth or "bending."

It was not long until the new ideas of growth regulators were applied to practical problems. In 1933 it was shown that indoleacetic acid would cause roots to form on stems and even on fruits. Intense interest was aroused throughout the world. New discoveries and applications followed rapidly.

Among the most important of these, in addition to the rooting of cuttings, were the prevention of preharvest drop of fruits, increase in fruit set, induction of seedlessness in fruits, prolongation of dormancy in nursery stock, delay in blossoming of fruit trees, regulation of flowering in pineapple, defoliation, thinning of fruit, hastening of fruit maturity, hastening the coloring of fruit, reducing water loss in fresh vegetables, ripening fruit artificially, and destruction of weeds and undesired woody plants.

But how do plant regulators work and under what conditions do they work? The scientist would say that we still do not know much about it; yet some facts are known.

For example, regulators are most effective when conditions are favorable to growth; and they are most likely to act upon young, immature, and growing parts such as the growing tip of a shoot or a bud, the actively growing regions in which roots are formed, the growing pollen tube, developing flower parts, germinating seeds, and the abscission layer which develops when blossoms, fruits, and leaves fall from the tree.

The so-called delayed effect of 2,4-D on apple fruits is due to the fact that the chemical induces changes in the actively growing and differentiating flower bud and leaf bud parts

(Continued on page 38)

Dr. H. B. Tukey, head of the department of horticulture at Michigan State College and associate editor of AMERICAN FRUIT GROWER, has been an active worker in the field of growth regulators. Dr. C. L. Hamner and he are credited with the first published reports of 2,4-D as a herbicide. Interestingly enough from the horticultural point of view, the experiments dealt with the destruction of bindweed in a stoolblock of Malling rootstocks.—Ed.

Growth Regulators on GRAPES

The outlook for commercial use of growth regulating sprays shows promise for replacing the costly hand labor job of girdling canes to increase the size of seedless grapes

By R. J. WEAVER
University of California

GIRDLING has been the accepted practice for increasing berry size of Thompson Seedless and other seedless grapes intended for table use. It is also used to obtain compact clusters with larger seedless berries in the production of Black Corinth, the grape used to produce dried currants. The operation, however, is expensive and occasionally results in death of the girdled cane.

In an effort to discover a cheaper and better means of attaining results similar to girdling, applications of about 20 growth regulators have been made during the past four years. The most effective of these was found to be 4-chlorophenoxyacetic-para-chlorophenoxyacetic acid. To date most of the work has been done with Thompson Seedless and Black Corinth grapes.

In 1952, 4-chlorophenoxyacetic acid was tested in plots in several counties in California. The clusters and usually much of the foliage were thoroughly wetted. The Thompson Seedless berries of the sprayed cluster were larger than untreated controls.

A further increase in berry size was produced by girdling in addition to the application of growth regulator. Spraying usually increased berry size about 30 per cent over that of corresponding unsprayed clusters. In some plots spraying resulted in berries just as large as those produced by girdling alone.

The concentration of growth regulator that resulted in the greatest increase in size of berry has not always been the same in the various plots of Thompson Seedless. The compound at 5, 10, or 15 parts in a million parts (ppm) of water, however, has usually produced a marked increase in size. Growth regulator at 25 ppm or less caused little or no injury to Thompson Seedless, although higher concentrations produced severe injury.

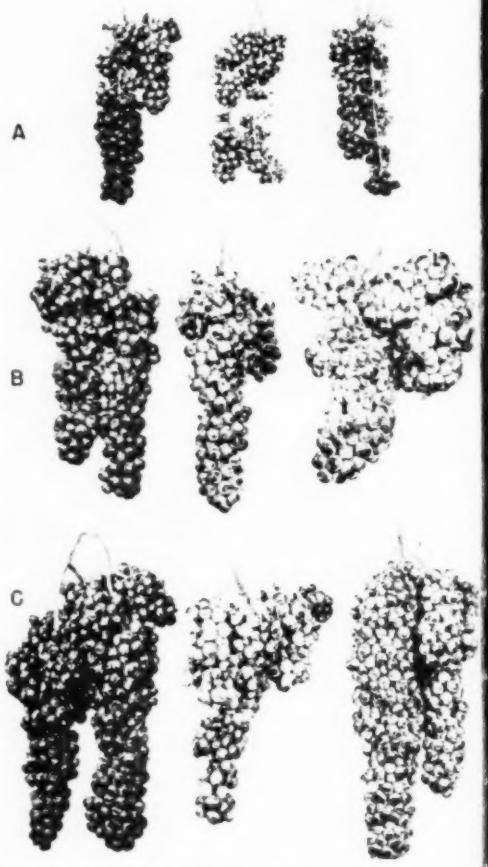
Growth regulator increased the thickness of pedicels or cap stems of Thompson Seedless. The cap stems of sprayed clusters were attached more firmly to the berry than those of corresponding unsprayed clusters. A preliminary experiment indicated that growth regulator decreased the amount of berry shatter. This might be associated with better storage and shipping qualities.

Fruit on overcropped vines of Thompson Seedless did not respond to the growth regulator. Hence, the crop must be reduced as is done with girdling. Spraying should be done immediately after the shatter of impotent flowers following bloom since delay in spraying lessens the beneficial effect on size of the berry.

When Black Corinth vines were sprayed at full bloom berries with hard, empty seeds developed which would make the fruit worthless for production of currants. A delay in spraying of about one week resulted in a good set of berries that attained large size and which contained no hard seeds.

Applications of growth regulator to the seedless varieties, Black Monukka, White Corinth, and Sultana, also increased size of berries. As yet no benefits have been obtained with seeded varieties as a result of treatment with a growth regulator.

This work is still largely in the experimental stage. However, many growers plan to apply sprays of growth regulator, at least on a small scale, this coming season. The outlook for commercial use of growth regulators on seedless grapes is quite promising. THE END



Black Corinth grapes 84 days after treatment with growth regulator. A—not sprayed, not girdled; B—not sprayed, girdled; and C—sprayed with 4-chlorophenoxyacetic acid at 25 ppm, not girdled. Effects of girdling and growth regulator each resulted in compact clusters.

Growth Regulators on APPLES and PEARS

Progress in the field of harvest sprays for drop control shows NAA bowing to 2,4-D for Bartlett pear and the new chemical 2,4,5-TP for commercial varieties of apples

By L. P. BATJER
U.S. Department of Agriculture

MOST apple and pear growers are familiar with the practice of using growth regulating sprays to reduce losses from harvest drop. This discovery was made in 1939, and the results were so outstanding from the very beginning that fruit growers were quick to use the sprays as a standard commercial practice.

Naphthaleneacetic acid (NAA), which was the sole chemical used for this purpose for a number of years, was recognized as having certain limitations and experimenters continued to search for materials that would do a better job. This article summarizes the present status of these sprays in order that those who are interested may be informed regarding the most recent developments in this important field.

Naphthaleneacetic acid under most conditions is effective in preventing drop of apples and pears but has the disadvantage of being limited in its effective period. Because of this characteristic a special spray is needed for each variety according to its season of maturity. The duration of effect varies from only seven to 14 days in the case of McIntosh apples (eastern area) to three or four weeks for most varieties in the Pacific Northwest.

Use of NAA on eastern McIntosh, while helpful, has frequently been disappointing unless the spray application coincided with the beginning of drop and harvest was completed within a relatively short period of time. Other objections to this material when used in midwest and eastern orchards is the fact that it fails to work effectively on certain varieties (notably Wealthy and York Imperial) even when properly timed. In the Northwest, however, NAA has a relatively long effective period, and is generally regarded as satisfactory for all varieties grown in that area.

Several years ago it was found that 2,4-D (the material used for killing weeds) was highly effective in preventing the drop of certain varieties of apples and Bartlett pears. When used at a concentration of 5 to 8 parts per million (ppm) on Winesap and Stayman and 2 to 3 ppm on Bartlett pears, harvest drop is effectively controlled for a period of four to seven weeks. This chemical was found to be completely ineffective when used on other varieties of apples and pears. It is slower to take effect than NAA and for best results should be applied at least two weeks ahead of anticipated drop.

This spray is rapidly gaining favor for use on Bartlett pear and no injury has ever been reported when directions as to the form of 2,4-D and concentration are strictly followed. With Winesap and Stayman apples occasional injury has been observed in the spring following the use of 2,4-D the previous fall. This injury is confined to the weaker type of growth, particularly on lower limbs that were subjected to very thorough spray coverage. A number of fruit growers (particularly in the Northwest) are using 2,4-D on these varieties and are well satisfied with the results. Some who have experienced injury, however, have discontinued its use.

The use of 2,4-D is complicated by the fact that there is no product on the market prepared specially for preventing fruit drop. If one is interested in spraying Bartlett pears or apples it is imperative that he use only the non-volatile types of 2,4-D and carefully prepare a stock solution from a commercial preparation.

Several commercial firms have a satisfactory amine form of 2,4-D on the market containing 2,4-D at a concentration equivalent to four pounds of 2,4-D acid per gallon. A stock solution may be prepared by mixing one quart of this material in 12 gallons of water. One-fourth pint of this stock solution per 100 gallons of spray mixture is a safe and effective concentration for Bartlett pears. With Winesap and Stayman, one-half

Growth Regulators on APPLES and PEARS

(*Continued from preceding page*)
to two-thirds pint of the stock solution per 100 gallons would be required.

Results with a new chemical, 2,4,5-trichlorophenoxypropionic acid (2,4,5-TP)[1], have been so outstanding that this material would seem well along the way to replacing NAA as a drop preventing spray. This new material was first used on McIntosh in 1949 by the New York Experiment Station. The chief advantage of 2,4,5-TP over NAA is in the length of the effective period.

Sprays of 10 to 20 ppm generally retard the drop of McIntosh for a period of three weeks or more. The effective period on most other varieties is somewhat longer. In the Pacific Northwest a spray of 10 ppm will effectively prevent the drop of Delicious and Winesap apples for a period of five to seven weeks.

This long lasting effect of 2,4,5-TP makes it possible to spray most fall varieties at about the same time.

The possibilities of maturity effects of 2,4,5-TP should not be overlooked. Under eastern conditions the use of this material on summer varieties, as well as McIntosh, has frequently resulted in advanced maturity of the fruit and shorter storage life. This stimulatory effect in most cases has been most pronounced when the application has been made 10 days to two weeks ahead of anticipated drop.

It has been demonstrated that this effect can be reduced to a minimum by delaying the spray until a few days ahead of the beginning of harvest. With most fall varieties no direct stimulatory effect has been obtained provided concentration and spray timing are in accordance with recommended procedure for the particular variety and locality. Limited evidence indicates that 2,4,5-TP accelerates the ripening of Bartlett pears. Until more information is available it is not suggested for use on this fruit.

It should not be assumed that benefits in added color will result from the use of 2,4,5-TP. No such effects have been obtained unless the spray resulted in advancing maturity. In other words, it is believed that increase in red color from use of 2,4,5-TP is a result of maturation rather than a directly induced coloration.

In most areas 2,4,5-TP can be applied in concentrate form. For this type of application probably not more than 48 grams of active ingredient per acre should be used as a general rule. This would be the amount contained in 1,200 gallons (10 ppm concentration) of "bulk" spray solution.

The superiority of 2,4,5-TP over NAA for most varieties and most areas seems well established because of its greater intensity and duration of effect. Even in the Northwest where the use of NAA has given satisfactory results many growers will probably change to 2,4,5-TP.

If this material is used according to directions there should be little or no ripening effect on the fruit except in the case of summer varieties and McIntosh. As pointed out, this effect can be reduced to a minimum by proper timing and concentration.

In most cases it is extremely important that sprays applied for the prevention of drop do not stimulate fruit ripening. These drop preventing sprays do not directly affect fruit ripening of most fall apple varieties.

With the effective use of these sprays a certain amount of fruit that otherwise would drop remains on the trees. Naturally these fruits are among the most mature and if they are not harvested within a reasonable period, they become overmature and their keeping quality is impaired. Overmaturity of this type is therefore an indirect effect of the spray.

To avoid overmaturity following the use of drop prevention sprays selective picking should by all means be practiced, particularly during warm harvest periods when picking is delayed because of slow development of color. THE END

[1] On the market under such trade names as Color-Set, Color-Fix, Sta-Set, and Fruitone T.

HOW NAA THINS APPLES

By L. C. LUCKWILL

Dr. Luckwill, who is with the Long Ashton Research Station at Bristol, England, is one of the leaders in the field of growth regulators in relation to fruit set, fruit thinning, and fruit development. His research is providing the answer to many grower problems.—*Ed.*

TO FRUIT growers familiar with the use of naphthaleneacetic acid (NAA) as a preharvest spray to reduce fruit drop, the use of this same substance as a fruit thinning agent may seem paradoxical. For, unlike dinitro materials or oil-wax emulsions, which reduce fruit set by preventing pollination, post blossom applications of NAA actively promote the drop of young growing fruitlets. As a result of experiments at Long Ashton Research Station the mechanism of this thinning action is now fairly well understood.

It is important to realize that, at whatever stage of development it is applied, NAA retards fruit drop for a limited period. With the usual preharvest concentration of 10 parts per million (10 ppm) this antidrop effect usually lasts 10 to 14 days, by which time the fruit is normally harvested.

With the somewhat higher concentrations used for thinning, application of the spray is followed by a period of reduced drop lasting two to four weeks; but once this antidrop effect has worn off, the growing fruitlets show an exceptionally heavy drop during the following two to three weeks. The direct cause of this delayed drop is seed abortion induced by the growth regulator.

For a long time it has been realized that the "first" and "second" (June) drops of apples are closely linked with seed development. As long ago as 1917 Dr. Heinicke of Cornell Agricultural Experiment Station suggested that the developing seeds have a "pulling power" for sap which enables those fruits with the most seeds to develop at the expense of those with fewer seeds.

This explanation was only partly correct for we now know that the chief factor controlling these early periods of fruit drop is a natural antidrop hormone produced by the seeds at certain stages of development. The more "good" seeds a fruit contains, the more antidrop hormone it will produce, and the greater are its chances of remaining attached to the spur.

From this it will be clear that any factor, be it frost, insect damage, or naphthaleneacetic acid which results in the destruction of a proportion of the developing seeds, will promote fruit drop.

Our experiments with naphthaleneacetic acid have shown that for any one variety there is a close relationship between the concentration of the spray, the percentage of seeds which abort, and the increase in fruit drop which follows. The seeds appear to be sensitive to the growth regulator only during the early stages of development.

Once the nutritive endosperm tissue

(*Continued on page* 50)

Growth Regulators in WEED CONTROL

By D. D. HEMPHILL
University of Missouri

ONE of the most striking advances in agriculture during the past decade has been the use of 2,4-D and other chemicals for selective weed and woody plant control.

Chemical weed control is not a new practice. Sulphuric acid was used for killing mustard in small grain as early as 1890, and the weed-killing properties of sodium chlorate were discovered in 1926. However, important advances were made in this field only after the discovery in 1942 of the remarkable herbicidal properties of 2,4-D. Although 2,4-D is still the most important hormone-like herbicide, new hormone-type chemicals that are more effective and selective are available.

Many of the latter are not of a hormonal nature and will find use in crops such as grapes that are extremely sensitive to hormone-type herbicides. Moreover, research by agricultural experiment stations and industry has developed methods whereby caustic non-selective chemicals may be used as selective materials by special methods of application.

A weed killer such as 2,4-D is translocated throughout the plant and causes death of the plants by altering the growth processes that occur in the living plant. It is a selective herbicide in that it will kill some plants at concentrations that are not seriously injurious to others. In general broad-leaved plants are much more susceptible to 2,4-D than are narrow-leaved plants such as grasses.

Methods of applying weed killers depend upon the crop and the type of chemical being used. As yet we do not have effective selective chemicals that can be used on all our fruit crops but in some of these cases we can make use of non-selective contact materials such as the dinitros.

Some plants show considerable tolerance to 2,4-D and other herbicidal type materials, but serious injury can result if too high concentrations are used. In general it is advisable to get the maximum amount of the chemical on the weed pest and as little as possible on the crop.

Sprays directed to the base of the plant are used in the case of grapes. Some hormone-type herbicides are in an inactive stage when on the plant but become effective after being broken down in the soil by the bacteria. Such a chemical is sodium 2,4-dichlorophenoxyethyl sulfate (SES) which is sold under the trade name of Crag Herbicide I.

Another recent approach to this problem is the use of the chemical in pellet form so it can be applied without being absorbed through the plant foliage. With both methods, the most successful results are obtained by treating while the weed seeds are germinating or before the weed seedlings attain any appreciable size.

Following are some of the ways in which chemicals can be used to control weeds and woody plant pests in our fruit crops:

Apples—In most apple orchards the worst pests are poison ivy, poison oak, brambles, and perennial weeds such as bindweed and nightshade species. Poison ivy can be controlled fairly successfully with ammonium sulfamate (Ammate) applied as a wetting spray of one pound per gallon or with 2,4-D in the salt form at the rate of one and one-half to two pounds per 100 gallons.

Perennial weeds and woody plants are most susceptible when the topmost leaves on the new growth are reaching full size. Some regrowth may occur and a second application is usually made later in the same season, using ammonium sulfamate or in the following season using 2,4-D or ammonium sulfamate.

Application of hormone-type herbicides such as 2,4-D during the summer near the time of fruit bud differentiation should be avoided. Reduced crop or deformed fruit may result.

The herbicide 2,4,5-T is more effective on brambles and poison ivy than 2,4-D but it is also more hazardous to use in the orchard. It should be used at the rate of one to one and one-half pounds per 100 gallons of water.

Grapes—Grapes are extremely sensitive to 2,4-D and 2,4,5-T. Where weeds beneath the trellis cannot be controlled effectively with a grape hoe, they can be controlled by contact herbicides such as oil emulsions fortified with dinitros such as dinitro - ortho - secondary - butyl phenol (DNBP).

Use 10 to 20 gallons of fuel oil plus one to two pounds of DNBP per 100 gallons of spray. Use a suitable emulsifying agent and make certain that the oil remains emulsified.

(*Continued on page* 40)

Chemical sprays save hand labor. The unsprayed row of strawberries at left was hoed and hand weeded four times while the row at right was hoed and hand weeded once and sprayed three times.

CAPTAN

THE NEW DISCOVERY IN FRUIT FUNGICIDES

By ROBERT H. DAINES

Dr. Daines, who is responsible for the development of Captan, tells of his early experiments, how his hopes for a fungicide that will give fine fruit finish were realized, and makes suggestions on how to use Captan most effectively.—Ed.

PERHAPS the greatest need of the eastern apple grower is a spray schedule that will adequately control apple pests and at the same time permit the development of fruit of fine finish. In New Jersey all sulfur fungicides or ferbam when used in the petalfall and early cover sprays frequently result in considerable russeting of the fruit of sensitive varieties. With the development of a market that pays a premium for russet-free apples, the need becomes apparent for safer fungicides and insecticides than some in general use.

In August, 1945, the Standard Oil Development Company and Rutgers University completed a fellowship agreement designed to make a thorough and systematic study of petroleum derivatives in order to determine their potential value as fungicides, insecticides, soil fumigants, etc. To this project Standard Oil assigned chemists to supply chemical information and the chemicals for testing.

Rutgers University, at the same time, appointed the biologists for this co-operative venture. Dr. Bailey Pepper, head of the entomology department was given charge of the project budget and of the work to be done in the entomology department. I was made responsible for the work in the department of plant pathology. Later, Dr. Lyle Hagmann, entomologist, was employed to conduct, with the aid of students, the work in entomology and to assist with certain phases of the work in plant pathology.

Undoubtedly the representatives of the Standard Oil Company hoped that the team of chemists and biologists working on this project would develop a good marketable product. Working as I do on the control of fruit diseases, I also entertained the hope that an effective fungicide would be found that would fill the pressing need of the eastern apple industry. Since at this stage of the project dreams were the order of the day, I was willing to add to the above "order" a fungicide showing good bactericidal properties as well. Both partners in this project realized their hopes to a surprising degree in the synthesis, discovery, and early development of SR 406, now known as Captan.

During the following five years 2,200 chemicals were sent to the university for testing. Each of these was carefully tested in the laboratory against two well-known fungi. Those that exhibited proper fungicidal ability were tried on green plants for injury, and some of those that passed both tests were taken into the orchard and field for disease control studies. Of the 2,200 materials, Captan was the 406th to be studied, hence the original name, SR (Standard Rutgers) 406.

Following greenhouse tests in which Captan was used on beans for mildew control, the material was tested in the orchard, beginning in 1947, against common diseases affecting apples, peaches, and cherries. In these tests 50 per cent wettable Captan was used in a dosage series of one, two, and four pounds per 100 gallons. No lime was used in these mixtures since laboratory tests had already indicated that lime destroyed the fungicidal properties of Captan.

In the first apple tests using Captan, the fungicide was applied to blocks of Red Delicious beginning with the prepink application. Application was continued, on a seven-day schedule, through five cover sprays. Lead arsenate and DDT were used with Captan when needed.

Shortly after application of the first cover spray, small round spots resembling frog-eye were observed on the foliage sprayed with two and four pounds of Captan. Close inspection of the fruit, however, showed no evidence of injury, and since the material was giving good scab control, the treatments were continued.

Continued careful observation of these trees showed that the foliage injury did not progress and that new injured areas did not develop. It was also observed that the affected leaves remained green and functional and did not drop prematurely.

At harvesttime records were taken on disease control and fruit finish. It was found that Captan at the rate of two and four pounds provided excellent control of scab and Brooks' fruit spot, and also gave evidence of being effective against black pox. In addition the finish of the fruit in the Captan block proved to be the best in the entire experiment.

(Continued on page 32)

IN CONCENTRATE SPRAYS...

—John Bean photo

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State NEWS

- **New Jersey Growers Tax Themselves for Apple Promotion**
- **Jack Frost Hits California Fruit Crops**

NEW JERSEY—The fifth annual meeting of the New Jersey Apple Institute was held at Mount Holly on March 17. Realizing the need for more adequate financing of apple promotion and publicity, a recommendation to base membership payments on two cents per bushel for all apples above the juice grade was unanimously approved.

It is anticipated that this change in the method of computing membership payments will more than triple the institute revenue during a normal crop year. Membership payments in the past have been based on $1 per acre for apple trees of bearing age.

A portion of the money received through membership payments may be used to help finance a national apple promotion and publicity program if such a project is sponsored by the National Apple Institute or some other national organization interested in increasing the demand for fresh apples.—*Arthur J. Farley, Sec'y, New Brunswick.*

WASHINGTON—Pierce County is the center of red raspberry production in the nation. Our predominating variety has been and is the "Washington," a sweet raspberry. However, the industry is looking for a hardier variety with fruit superior to the Washington.

Propagation and selection of new hybrids has been stepped up in the last five years. Promising selections are placed with the Pierce County Crop Improvement Association for grower testing, which is at least a three-year program.

Three new selections have just been distributed to 11 members—the 156, 308, and Ore. 549. This makes a total of seven selections now out on grower trial tests. The first—316—went out the spring of 1950. Growers are watching these with intense interest.—*Morrill Delano, Sec'y & County Agent, Tacoma.*

PENNSYLVANIA—In the interest of promoting raspberry production in the area, John A. Hauser, president of The C. H. Musselman Company, processors, recently assured more than 200 raspberry growers in the Biglerville area that the company would pay a minimum of 20 cents a pound this year for raspberries of proper grade and quality. Prices last year in the area were around 16 cents a pound. Chief varieties grown are Cumberland and Morrison, with some Logan.

CALIFORNIA—Unusually late frosts hit the central and northern parts of the state causing what may prove to be heavy damage to grapes, plums, strawberries, apricots, and prunes, with lesser damage to cherries and pears. Damage to grapes may be sufficiently heavy, it is reported, that growers whose crops were not hit severely can look forward to favorable markets.

MINNESOTA—A 12-pint crate for the spring crop of strawberries will be used for the first time this year by some of the berry shippers. Previously, most of the crop has been shipped in 24-quart crates.—*J. D. Winter, Sec'y, Mound.*

The National Apple Institute annual meeting in 1953 is scheduled to take place June 17-19, at Roanoke, Va. Truman Nold, Secretary, is located at 726 Jackson Place, Washington 6, D. C.

VERMONT—Ben H. Beck, Middlebury, was elected president of the Vermont State Horticultural Society at the annual business meeting and fruit conference held at Middlebury, April 2-3. Earl Krantz, of Middlebury, was elected vice-president.

New members elected to the executive committee include Elmer Wright, Middlebury, and William Tresler, South Hero. William Stalker, Jr., manager of the Shoreham Co-operative Apple Producers Association, was elected delegate to the New York-New England Apple Institute. Carleton G. Howe, Bennington County fruit grower, was elected to the Agricultural College Advisory Committee.

The two-day conference and trade show for the second year in a row has been late enough in the winter to cause some conflict with the opening of the pest control season. Plans were therefore made to hold this event during the winter of 1954.

An unusually mild spring has brought McIntosh buds into the green tip stage fully two weeks earlier than a year ago which means that spraying for scab control is only a matter of days away unless seasonally cool weather returns. Crop prospects are very favorable.—*C. Lyman Calahan, Sec'y, Burlington.*

ILLINOIS—"Illinois Fruit" was the topic of the Illinois Agricultural Association television show "Farm Town USA" on April 11. Miss Shirley Eaton of Murphysboro, Illinois Fruit Queen for 1952, was

(*Continued on page 20*)

FRUIT PEST HANDBOOK

(TWENTY-THIRD OF A SERIES)

PERIODICAL CICADA

LATE in May, 1953, hordes of the periodical cicada, or 17-year locust, will invade hundreds of orchards in the Middle Appalachian states and in other states westward to Indiana and Illinois. They will damage a great deal of one- to three-year wood. Recently-set trees may be killed back to a stub. The younger wood on bearing trees may be more or less injured, and some of it will break off, especially if carrying a load of fruit.

This cicada has a most unusual life story. It lives 17 (or in some areas 13) years underground. When enough years have elapsed, the cicadas, now full grown, make their way to the surface and climb tree trunks, fence posts, or coarse weed stalks. The skin then breaks open, and the winged cicada comes out.

(*Continued on page 48*)

Photographs show, top to bottom: Cicada on underside of grape cane; break in cane caused by egg puncture by cicada; egg punctures in cane.

Photographs by G. W. Still, USDA

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- **Micro Dritomic Sulfur** (wettable sulfur)
- **Puratized Apple Spray and Puratized Agricultural Spray** (organic mercury fungicides)

For Mites:
- **Genite 883 Spray Powder** (p-chlorophenyl p-chlorobenzene 50%)
- **Genithion P-15 Spray Powder** (contains 15% Parathion)
- **15% Aramite Spray Powder**
- **Aramite EM-2 Emulsifiable Concentrate**

For Curculio:
- **50% Methoxychlor Spray Powder**
- **Dieldrin EM 1½ Emulsifiable Concentrate** (up to first cover only)
- **50% Dieldrin Spray Powder** (up to first cover only)
- **Genithion P-15 Spray Powder**
- **Lead Arsenate, Standard and Astringent**

For Codling Moth:
- **Genitox S-50 and S-75 Spray Powders** (contain 50% and 75% DDT)
- **Lead Arsenate, Standard and Astringent**
- **Genithion P-15 Spray Powder**

For Red-banded Leaf Roller:
- **50% Dieldrin Spray Powder**
- **Lead Arsenate, Standard and Astringent**
- **Genithion P-15 Spray Powder**

For Aphids:
- **Nicotine Sulfate Solution**
- **Genithion P-15 Spray Powder**

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CALENDAR OF COMING MEETINGS AND EXHIBITS

Apr. 30-May 1—Shenandoah Apple Blossom Festival, Winchester, Va.—Jean James Demoreast, Dept. of Publicity, Winchester, Va.

May 3-9—Southwestern Michigan blossom festival week, St. Joseph.

May 7-9—Washington state apple blossom festival, Wenatchee.—Fred G. Campbell, Dir.-Gen., Wenatchee.

June 4-6—Annual strawberry festival, Lebanon, Ore.

June 17-19—National Apple Institute annual meeting, Roanoke, Va.—Truman Nold, Sec'y, 726 Jackson Place, Washington 6, D.C.

June 22-24—South Dakota State Horticultural Society annual meeting, Britton.—W. A. Simmons, Sec'y, Sioux Falls.

June 24—Illinois State Horticultural Society orchard day, Nugent Shipanski Orchards, Grafton. Program will feature orchard machinery and supply exhibits, demonstrations, entertainment by radio personalities, and lunch.—Harold J. Hartley, Sec'y, Carbondale.

July 7-8—Texas Pecan Growers Association 32nd annual meeting, Memorial Student Center, College Station.—John E. Hutchison, Sec'y, College Station.

July 22—University of Connecticut Fruit Day, Storrs. Orchard experiments and equipment will be featured.

Aug. 10-13—International Apple Association 59th annual convention, Hotel Sherman, Chicago, Ill.—Norbert W. Eschmeyer, Sec'y, 1302 18th St. N. W., Washington 6, D. C.

Aug. 14—Massachusetts Fruit Growers Association summer meeting, Davis Orchard, Bolton.—A. P. French, Sec'y, Amherst.

Aug. 31-Sept. 2—Northern Nut Growers Association annual meeting and tour, Rochester, N.Y.—George Salzer, Vice-Pres., 169 Garford Road, Rochester, N.Y.

Sept.—Illinois State fruit festival, Murphysboro.

Sept. 26—Sixth Annual Cranberry Festival, Edaville Plantation, South Carver, Mass.—L. R. Williams, Merch. Mgr., American Cranberry Exchange, 5 S. Sixth St., New Bedford, Mass.

Oct. 22-31—National Apple Week.—National Apple Week Assn., 1302 18th St., N.W., Washington 6, D.C.

Nov. 3-5—Florida State Horticultural Society 66th annual meeting, Daytona Beach.—E. L. Spencer, Sec'y, Bradenton.

Dec. 3-4—Oregon State Horticultural Society 68th annual meeting, Oregon State College, Corvallis.—C. O. Rawlings, Sec'y, Corvallis.

STATE NEWS

(Continued from page 18)

featured on the program which aimed to acquaint the general public with fruit production in the state.—*Harold J. Hartley, Sec'y, Carbondale.*

MAINE—Customers stopping at the Otto Wallingford orchards in Auburn last fall were given a double "treat"—an opportunity to sit and sip cider and at the same time watch the entire process of cider making. Otto's new cider press is so constructed that it may be quickly and thoroughly cleaned between loads. Otto states that sales of cider, and, of course, apples went up very satisfactorily.—*Frank J. McDonald, Sec'y, Monmouth.*

NORTH DAKOTA—Three new apple varieties are being introduced this year by R. L. Wodarz of Wyndmere. Wodarz, who is currently president of the North Dakota horticultural society, has been working with fruits on his Richland County farm for over 20 years.

In addition to growing seedlings, he has repeatedly demonstrated the value of top-working semi-hardy varieties or varieties with weak crotches onto hardy trunks.

The varieties Mr. Wodarz is introducing and a brief description of each are as follows: *Richland:* Open pollinated seedling of Adno; fruit oblong when fully ripe in late August, pleasant to eat out of hand. About same size as Duchess. Resembles Delicious in fruit characteristics.

Cranberry: Open pollinated seedling of Redflesh crab. Dolgo suspected of being male parent. Fruit size of Dolgo but more

round. Skin and flesh dark red. Tree very hardy, has not blighted to date. Pink flowers; leaves color beautifully in autumn. Resembles Dolgo but more ornamental and matures later.

Reta: Open pollinated seedling of McIntosh. Fruit smallish, yellow turning red on one side when dead ripe. Sweet and delicious out of hand. Somewhat late in ripening. Children like it.—*Harry A. Graves, Sec'y, Fargo.*

CONNECTICUT—Radio Spray Service is now providing growers twice weekly with recommendations for pest control in orchards. The broadcasts, which were started on April 3, are made on Tuesday and Friday over Station WTIC at 6:35 AM. They will continue until mid-August. The extension service also will hold twilight meetings in growers' orchards for the purpose of discussing current insect and disease problems. These meetings are arranged by the county agents.

Prof. Howard A. Rollins, head of the plant science department, University of Connecticut, who has been on leave for a year's work at Lebanon with the Point Four Program, is expected back in early May.

Harold M. Rogers, Rogers Orchards, Southington, is on a six weeks' tour of orchard conditions in South America.—*S. P. Hollister, Sec'y, Storrs.*

FLORIDA—Spring found most citrus growers in a cheerful mood. Except for tangerines and white-seeded grapefruit, citrus prices for the big, high quality crop have been satisfactory for most of the 1952-53 season.

At no time during the winter did temperatures drop low enough to pose a serious threat to trees or fruit. Spring weather has been mostly favorable and soil moisture in February, March, and April was generally more adequate than during those same months in past years.

The bloom for the 1953-54 crop was two to three weeks earlier than usual. A

Illinois State Horticultural Society activities this year are in the capable hands of these growers. Standing, left to right: C. F. Heaton, Jr., New Burnside, treasurer; Harold J. Hartley, Carbondale, secretary. Seated, left to right: Curt E. Eckert, Belleville, first vice-president; Lester R. Stone, East Moline, president; Frank Chatten, Quincy, second vice-president.

good crop has set and unless bad weather develops it will be another first-rate crop.

A destructive disease of young citrus trees that has become of increasing importance in recent years is gangrene or young-tree dieback. According to Dr. J. F. L. Childs of the U.S. Horticultural Field Station, Orlando, who has done extensive research on this trouble, the disease apparently enters young trees through topping wounds,

(*Continued on page 24*)

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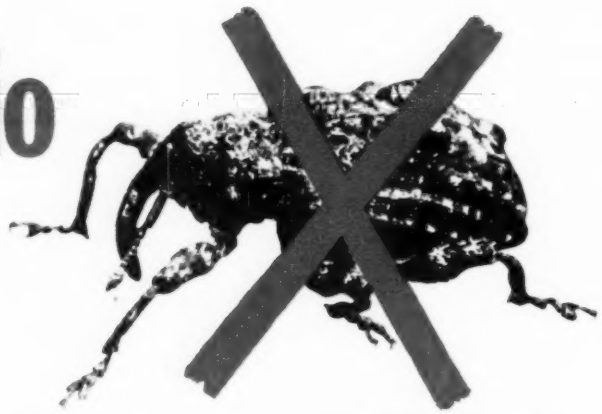

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You can get excellent control of other insects, too, including Oriental fruit moth, apple maggot, Japanese beetle and cherry maggots.

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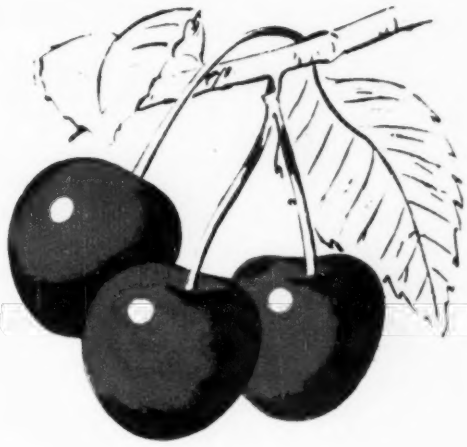
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

DU PONT CHEMICALS FOR THE FARM INCLUDE: *Fungicides:* MANZATE,® PARZATE® (zineb and nabam), FERMATE® ferbam, ZERLATE® ziram, Copper-A® (Fixed Copper), SULFORON® and SULFORON®-X Wettable Sulfurs . . . *Insecticides:* DEENATE® DDT,MARLATE® Methoxychlor, LEXONE® Benzene Hexachloride, KRENITE® Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* CMU, AMMATE,® 2,4-D, TCA and 2,4,5-T . . . *Also:* Du Pont Cotton Dusts, Du Pont Spreader-Sticker, PARMONE® Fruit Drop Inhibitor, and many others.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.



Avoid Residue Problems!

Use Du Pont MARLATE®

Methoxychlor Insecticide

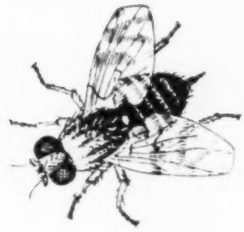
TO CONTROL CHERRY FRUIT FLY AND FRUIT WORM

You can use "Marlate" all season, including close to harvest, to prevent "wormy" cherries. Spray residue of "Marlate" methoxychlor insecticide on the fruit controls these insects without being hazardous to consumers.

Use "Marlate" also on early apples, peaches, plums and other fruits that require insect control right up to picking time.

"Marlate" controls Oriental fruit moth, plum curculio, codling moth, apple maggot, Japanese beetle, leafhoppers, and certain other fruit pests. Furthermore, it gives exceptional results on vegetable and forage crops where other insecticides often create a residue problem.

"Marlate" 50 is a 50% methoxychlor wettable powder formulated for general spray application. The emulsifiable oil formulation, "Marlate" 2-MR, is especially recommended for late-season applications on cherries where minimum visible residue is desired.



DU PONT CHEMICALS FOR THE FARM INCLUDE: *Fungicides:* MANZATE,* PARZATE* (zineb and nabam), FERMATE* ferbam, ZERLATE* ziram, Copper-A (Fixed Copper), SULFORON* and SULFORON*-X Wettable Sulfurs . . . *Insecticides:* DEENATE* DDT, MARLATE* Methoxychlor, LEXONE* Benzene Hexachloride, KRENITE* Dinitro Spray, EPN 300 Insecticide, Calcium Arsenate, Lead Arsenate . . . *Weed and Brush Killers:* CMU, AMMATE*, 2,4-D, TCA and 2,4,5-T . . . *Also:* Du Pont Cotton Dusts, Du Pont Spreader Sticker, PARMONE* Fruit Drop Inhibitor, and many others.

*REG. U. S. PAT. OFF.

[*On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.*]

DU PONT

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BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

The International Apple Association recently used a novel way of urging its members to secure new members for the association. Enclosed with a letter sent to each member was a small packet of petunia seeds. The letter read:

"We enclose a few petunia seeds. With a little care and attention they will develop into beautiful blooms.

"Equal attention and care in securing one member for the IAA will bring growth to your Association and enable it to better serve you and the Industry.

"We enclose two Membership Seeds. Please plant now."

The "two Membership Seeds" were application cards.

STATE NEWS

(*Continued from page 21*)

then moves down the trunk and may kill the tree to the ground.

Dr. Childs found that application of asphalt emulsion to topping wounds will provide an effective barrier against the disease. Fred Lawrence, citriculturist with the Florida Agricultural Extension Service, says wise growers will apply the emulsion before the trees are dug from the nursery or on the day they are set in the field.

The Florida Tropical Fruit Growers Association, with headquarters in Goulds, has joined the Florida Citrus Exchange. Avocados, mangos, and limes produced by the association's members will now be marketed by the exchange.—*Clyde Beale, Assoc. Ed., Gainesville.*

GEORGIA—This should be a good peach year in Georgia although the crop will not be as large as was at first estimated. There was a sufficient number of cold hours for both blossoms and leaves in all of the peach sections.

In the Fort Valley peach section most varieties are not set as heavy as was expected. Early Hiley and Hiley have a light set but the Southland variety has a heavy crop. The May drop is about midway (Apr. 15). Temperatures have been such that it now looks as if the number of days from full bloom to maturity would be about average. From all indications now the harvest season will be about one week earlier than normal.

In the Middle Georgia peach section peaches are growing rapidly. Most varieties will require little thinning. Few curculio have been found in orchards in this section since most growers use parathion or similar insecticides.

George Firor, extension horticulturist, has developed a spray information service through which peach and apple growers are advised on the emergence of insects and the prevalence of disease. Information from all sections of the state is sent to his office from which the growers are kept up-to-date by press, radio releases, and individual letters. This service is meeting with good grower response and is a co-operative effort of research and extension workers. —*Earl F. Savage, Experiment.*

TENNESSEE—There have been no serious frosts since our fruit trees started blooming and prospects are for a better than average crop of peaches and apples (with our fingers crossed). Strawberry acreage is very low, little better than 8,000 acres, and stands were poor because of

drought. Shipping should start by May 1 in Humboldt area and by May 10 from Portland and Dayton areas.

John C. Schablik, a member of the Tennessee horticultural society for over 30 years, died recently as a result of an auto accident. He was a native of Germany but came to this country at the age of 14 and had been a fruit grower at Portland for 45 years.—*L. V. Pratt, Sec'y, Nashville.*

OHIO—Vegetation was 10 days ahead of normal as of April 1, then cool weather checked growth. By mid-April season was only five days ahead of normal. Bud prospects are good.—*C. W. Ellenwood, Sec'y, Wooster.*

VIRGINIA—Reports are that the apple crop is spotted. Where trees bore a heavy crop last year bud is medium to poor, which makes for conditions that are hard to estimate.

Peaches are in shuck stage at Crozet with a heavy set to date.

Season is from 10 days to two weeks earlier than in 1952, which was about normal.—*John F. Watson, Sec'y, Staunton.*

MASSACHUSETTS—Wettest March on record. Fruit buds about two weeks early in development. Heavy bud count on McIntosh this year.—*L. P. French, Sec'y, Amherst.*

MARYLAND—With the season more than a week ahead, growers are checking their spraying operations and are trying to keep ahead of the apple scab and peach brown rot spores that have been flying around during the frequent rains. Bloom on peach has been good and apples seem to indicate a good-sized crop.

Paul E. Less, Salem, Ohio, speeds spraying operations in his orchard by hauling water to his sprayer in this 500-gallon tank mounted on a flatbed truck. A 3 h.p. gas engine drives a 2-inch self-priming pump. Two hoses draw water, one from the pond into the tank, the other from the tank into the sprayer. The tank is quickly removable from the truck.—*John Krill.*

R. Samuel Dillon, Jr., president of the state horticultural society, has returned from a three-week vacation in Mexico to rest up from a sick spell and seems ready to get into the strenuous work of managing his large acreage at Hancock.—*I. P. Vierheller, Secy, College Park.*

NEW YORK—Temperatures running five degrees above normal. One heavy rain spell. Bud looks heavy on R.I. Greening, good on McIntosh and other varieties. Trees that overbore in 1952 show light bud this year. Most trees show green tip.

Halloran Harrison Brown, 84, of Monsey, horticulturist and operator of one of the largest fruit farms in the South Hudson Valley, died recently. He served as president of the New York State Horticultural Society and was considered an authority on soil and the growing of tree fruits, berries, and vegetables suitable to the valley.—*D. M. Dalrymple, Sec'y, Lockport.*

The QUESTION BOX

At a recent fruit meeting I heard of a super honeybee developed through bee breeding work that will fly in cold, rainy weather and would be a great help in fruit pollination. Can you tell me more about this bee that is so aggressive that beekeepers have trouble handling it?—*Maryland*

The Division of Bee Culture of the USDA reports that frequently stories circulate about "super" bees, but as yet no bee line has been developed that seems especially promising for pollination activity during unfavorable weather.

Is TEPP effective against mites?—*Michigan*

TEPP will kill mites on contact. However, the other phosphate compounds such as EPN-300 or parathion have a longer residual period so are more effective.

I am planning to use one-half pound of Phygon XL, five pounds of NuGreen, and 20 pounds of Epsom salts per 100 gallons in the pink bud application this spring. I understand that Epsom salts acts as a safener for the Phygon but I am dubious about adding NuGreen to the combination. Can you give me any information?—*New Hampshire*

There has been no evidence of chemical or physiological incompatibility of NuGreen and pesticides either during the several years of developmental work by the E. I. du Pont de Nemours & Company or during the past several seasons that it has had widespread commercial use. In 1951 it was reported that the combination of NuGreen and liquid lime sulfur might have contributed partially to some foliage injury. However, this was not substantiated last year.

I am confused on the terms apple juice and apple cider. What are the differences, if any, between the two?—*Oregon*

The term apple juice is reserved for the product which contains less than 0.5 per cent alcohol, according to Smock and Neubert in their book *Apples and Apple Products.* Products which contain more than 0.5 per cent alcohol and less than 8 per cent alcohol are termed cider. Cider is usually referred to as a fresh or chemically preserved product, and apple juice is applied to a product preserved by heat in hermetically sealed containers.

Is the small wheelbarrow type of mist blower adequate for spraying a small planting of trees?—*Pennsylvania*

According to investigations, mist sprayers of this type are not recommended for commercial orchards. However, they are very useful for spraying home orchards and small commercial orchards with small trees. Two manufacturers of this type of sprayers are: Cooley Spray Equipment Co., Somers, Conn.; and International Mutoscope Corp., 44-02 Eleventh St., Long Island City 1, N. Y.

"I like the job Black Leaf® 253 has done for me!"

—says **WILLIAM A. SCHLECHTWEG**
Crest Fruit Farms, R.D. 3, Freehold, N. J.

Black Leaf®
SPRAY MATERIALS

Aramite 25% Emulsifiable Concentrates
Aramite Wettable Powder 15%
Arsenate of Lead
BHC Wettable Powder 10%
DDT Wettable Powder 50%
Dieldrin Wettable Powder 25%
Black Leaf 40 • Black Leaf 155
Black Leaf 253
Chlordane Wettable Powder 40%
Ferbam Wettable Powder 76%
Lindane Wettable Powder 25%
Malathon Wettable Powder 25%
Parathion Wettable Powder 15%
Parathion Wettable Powder 25%
Phygon Wettable Powder 50%
T.D.E. Wettable Powder 50%
T.D.E. 25% E. C. • T.E.P.P. 40%
T.E.P.P. 20%
Dusting Sulphur

In addition to the spray materials listed above, many other pest control products carry the famous Black Leaf trademark — insecticides, fungicides, weedicides and rodenticides. Write for full information on the complete line.

The "LEAF" that protects the tree is a "Black Leaf" SPRAY

"I used Black Leaf 253 for the last two seasons and produced the cleanest, finest-finished fruit in my 25 years of experience," says W. A. Schlechtweg, prominent New Jersey apple grower. "I like the way Black Leaf 253 handles. It's dustless and has everything it takes to control all of the insects in a single spray mix. My 1952 crop of Red Delicious packed out U.S. Fancy and Extra Fancy grade. I am sold on the job Black Leaf 253 has done for me!"

Mr. Schlechtweg is another of the many leading orchardists alert to the advantages of Black Leaf 253, the new, multi-purpose, summer cover spray. You, too, can produce bigger yields of clean fruit at lower cost, by using Black Leaf 253, the modern cover spray that is replacing old-fashioned, complicated, expensive programs.

Black Leaf 253 controls codling moth, red-banded leafroller, leafhoppers, European red mite, red spider mite, San Jose scale, Forbes scale, and similar pests.

Black Leaf 253 is Black Leaf *Tobacco Base* "impregnated" with 25% of DDT and 3% of Parathion by an exclusive process.

Dustless. Black Leaf 253 is scientifically treated to eliminate dust. Just dump it in the water as the spray tank is refilling.

Compatible. Mixes with all the fungicides and other materials recommended in combination with DDT and Parathion.

Less residue. Black Leaf 253 provides excellent control with minimum chemical residue and essentially no visible residue.

It will pay you to switch to all-summer use of economical, highly-effective Black Leaf 253. Buy it from the man who sells you your spray materials or write for the name of your nearest supplier.

TOBACCO BY-PRODUCTS & CHEMICAL CORPORATION
Richmond 8, Virginia • *Sales Offices in 22 Cities*

DEPENDABLE PEST CONTROL PRODUCTS SINCE 1885

American Fruit Grower
WESTERN SECTION

One or two strong colonies of honeybees per acre, as in this almond orchard, are insurance for a bountiful harvest.

We Must Protect Our WESTERN BEE POPULATION

Here are nine pointers growers must observe if nature's pollinators are to have a long and useful life

By J. E. ECKERT

THE honeybee colony has been such a familiar sight in most sections of our country that its presence is often taken for granted. It is true that there are some bees in practically every orchard while it is in bloom and also in most of our pastures and cultivated crops.

In the early days when the orchards were small and nearly every farm kept a few colonies for the honey they produced, the number of bees was generally adequate. There were also several kinds of solitary bees and semi-social bees present to render valuable assistance in the cross-pollination of the diversified farm crops.

Conditions have changed materially with the increased mechanization of our farm operations. Instead of 100 acres being a rather sizable farm unit, farming has become big business and the number of acres one man can till with the aid of tractors and self-propelled harvesters has increased manyfold.

With the increased acreages of different crops, insect and weed pests have also increased to a point where they are a major issue. The chemical control of weeds, fungi, and insects is an important consideration for every producer of every crop in both the field and the orchard.

The old rail and board fences have given way to clean cultivation. The farm woodlot is fast disappearing and the weedy portions of cultivated farms are no more. Land planes and other leveling devices have made it possible to reduce waste lands to cultivated fields. Power sprayers have made it possible for the farmer and commercial pest control operator to cover hundreds and thousands of acres of various crops in a short space of time.

All of these factors have tended to reduce our native population of pollinating insects and sometimes to cause serious losses in our population of honeybees.

Chemicals of high toxicity are applied to all kinds of crops and frequently when they are being visited by the pollinators. Poisons are allowed to drift over adjacent legume crops or other plants covering pastures and fields surrounding those that are chemically treated. Lands bordering our highway systems are frequently laid bare of all vegetation by fire or weed control chemicals.

It is fortunate that the honeybee is one insect that can be increased in number and moved from place to place as required for pollination purposes. The beekeeper, the seed grower, and the orchardist have learned the value of the honeybee and are working together to produce the greatest possible yields of every given crop.

What, then, can be done by the orchardist and the farmer and the pest control operator to protect our western bee populations and still control our major pests economically? Here are nine pointers every grower should keep in mind:

1) Since many of our chemicals are highly toxic to the beneficial insects as well as to the injurious ones, and since there are now many substitutes for the arsenicals and other highly toxic poisons, compounds which are least toxic to the bees can be used for insect control.

2) The control of a majority of our injurious pests can be accomplished by the application of chemicals either before or after the blooming period, when they are no longer attractive to the bees for their nectar and pollen.

3) Chemical dusts are more injurious than the same chemical in

The author, J. E. ECKERT, is apiculturist at the University of California, Davis.

spray form, as a rule, and especially so since dusts drift farther, greater quantities have to be used, and they are harder to confine to the plants treated. The use of liquid sprays instead of dusts are in order. A notable example of this misuse of dusts was the great damage from 2,4-D dusts to various crops before this practice was barred.

4) Beekeepers can become familiar with pest control programs and keep or move their bees out of orchards or fields where growers use pest control methods highly injurious to the beneficial insects. Beekeepers can register the location of their apiaries with local county agents or farm advisors and pest control operators and ask to be notified in case injurious chemicals are to be applied to crops in bloom.

5) Where orchardists and other growers pay rentals for the services rendered by the honeybees, they can advise their neighbors of pest control programs which are least toxic to pollinating insects.

6) Hives of bees should be moved out of orchards before injurious chemicals are applied.

7) Cover crops in bloom should be disked under before toxic sprays are applied.

8) Consideration should be given to the fact that bees may fly one and one-half to two miles or more in gathering nectar and pollen. Protective measures are a community responsibility as the community profits most by the pollinating services of bees.

9) Spray only where necessary. "All-purpose sprays," to give cover protection in case injurious insects might appear, are highly dangerous to beneficial insects.

Compounds that are *highly toxic* to bees include the arsenicals, parathion and other organic phosphates, BHC, chlordane, dieldrin and lindane. Compounds which are *moderately toxic* are DDT and toxaphene. Comparatively safe are such chemicals as lime sulfur, copper sulfate, methoxychlor, aramite, sulphenone, powdered sulfur, and DDD. Parathion is one of the most deadly of the newer chemicals, for both insects *and* man.

If every fruit grower will remember that sprays and other practices which harm the bees hurt not only the beekeeper but the fruit grower as well, steps will soon be taken to include a safeguard for the pollinators in every pest control program which might harm bees. If we protect our honeybees, we will also protect many of our solitary bees which, once destroyed, seldom can be replaced. THE END

PROBLEMS IN FRUIT SET

The paradox of too many warm hours during the winter months and not enough cold ones plays havoc with flower buds in sunny California

By OMUND LILLELAND and DILLON S. BROWN
University of California

A warm winter caused all but the terminal flower bud on these apricot branches to die and shed.

CALIFORNIA'S famed winter climate may influence fruit set more than any other factor in this rich producing fruit state. Unusually warm winters are appreciated by winter tourists, but fruit growers know that a certain amount of winter chilling is needed for a good bloom and a bountiful crop.

Approximately 1,000 hours of temperatures below 45° F. in winter are needed for a satisfactory bloom. The dormant flower buds which begin their development in summer require a definite number of "cold hours" to remain alive until the burst of spring. Warm winters cause a heavy, premature drop of unopened flower buds and little or no bloom in the spring. California's winter temperatures are rarely or ever too cold for fruit trees; they are frequently not cold enough. The flower buds are not killed by winter cold; they are killed by winter warmth.

When a warm winter causes a light crop, the following favorable year may result in a very heavy bloom and fruit set. This heavy set frequently establishes an alternate bearing habit —a heavy crop one year followed by a light crop even though winters are sufficiently cold and temperatures during bloom are favorable. Alternate bearing in California should be termed more correctly "alternate blooming" since it is the absence of an abundant bloom that results in the light crop.

Fruit growers in California eagerly watch the summation of cold units during the winter months, and from this and the bearing history of their orchard they can predict with a fair degree of accuracy whether there will be a heavy bloom, a medium bloom, or a light bloom. They can also to a lesser degree predict whether it will be a sharp bloom with all blossoms opening in a period of three to five days or whether there will be a prolonged bloom sometimes lasting two to three weeks.

A more difficult and more elusive factor which also determines yields is the percentage of flowers which set and develop into fruits. A light bloom following a warm winter may turn out to be a good crop if a higher than usual percentage of flowers sets fruit. This actually did occur in 1951 when the warm 1950-51 winter produced a shy bloom and all expectancies of a light crop were upset by a very high "percentage set."

In contrast the 1951-52 winter brought ample chilling and a strong and abundant bloom in 1952, but maximum temperatures during bloom hovered between 50 and 60° F.—too cold for good pollination and fertilization. The percentage of blossoms which set fruit was therefore lower than usual, and only moderate to light fruit yields were harvested. The prospects of a heavy fruit set from a well chilled winter and an abundant bloom were nullified by cool weather at blooming time.

The 1953 blooming season has just passed. It has been fairly typical of a non-bud-chilling winter though perhaps not as poor as the summation of cold hours indicated earlier. The character of the bloom was definitely a low chilling type. Apricots and peaches bloomed over a long period, and some plums had two or three distinct flushes of bloom. There was a severe bud drop on the varieties which are known to have high chilling requirements.

Apricots, which in general have a high chilling requirement, exhibited an unusual blooming behavior. A casual observation suggested a light bloom early in the season, but a more careful counting disclosed many unopened blossoms which continued to open over an unusually long blooming period, perhaps the longest blooming period seen in apricots in the last 20 years.

Some concern has always been voiced as to the potential capacity of late and delayed bloom to set fruit. The history of the 1951 crop would suggest that blossoms which survive a warm winter can set a high percentage of fruit. It is too early to make any reliable estimate of the 1953 crop, but observations to date

suggest that a fair percentage of the flowers which survived the preceding warm winter will again set a crop.

There is an additional speculation that warm winters if not too unfavorable may occasionally cause an increased fruit set. This would occur during a spring of changeable weather when a prolonged bloom might partly experience some favorable pollination weather while a "cold winter" sharp bloom of short duration might coincide with a short period of unfavorable weather.

There are also factors other than winter chilling and alternate blooming which cause variations in yields from year to year in California orchards. Phenomena common to all fruit growing regions such as spring frosts and inclement weather during bloom, and in a few California orchards, a lack of orchard fertility, are responsible for variation in yields. Lack of sufficient irrigation may also contribute to a shy bloom and a low yield.

Fluctuations in the number of fruits which set are not always reflected accurately in yields, since California fruit growers in general remove by hand thinning a high percentage of the surplus fruit in years of heavy set and may do little or no fruit thinning when an occasional "light year" comes along.

Though the factors discussed above may modify yields, California's climate in general is responsible for a stability in fruit production probably not excelled elsewhere. THE END

HANDY ANDY

Old autos and trucks never die when a grower knows how to use his welding, cutting, and metal tools. For example, Dave Wheatley, fruit grower in the Napa Valley, California, has converted several of his old Chevrolet cars and trucks into rugged farm machines. The fertilizer distributor, shown above, has solved his problem of acids and alkalis corroding the metal.—*F. Hal Higgins*

Plan NOW for HARVEST HELP

Supply of western migratory labor will be tight this year. Here are steps to take now so you won't get caught out on a limb

WILL you have enough workers to pick your crop this year, or will a shortage of help delay your harvest with the added risk of unpicked fruit?

Over 100,000 migrant workers are needed each year in California. In Washington 25,000 pickers are hired for the apple crop alone. In the three Northwest states 65,000 workers are necessary to harvest the fruit crop. Of this number about 18,000 must come from the migratory stream which consists of workers who move from Texas, Oklahoma, Arizona, California, and some midwestern states.

National employment is high, and large numbers of workers are leaving the farm each year for the lure of high city wages. If the crop is heavy, help could be seriously short at harvest.

Gauge Your Needs Closely

There are steps you can take now to protect the harvest of your crop. Let the local representative of the Farm Placement Service know what your labor requirements will be. Advise him well before the time the workers are needed, and be sure to bring him up-to-date as changing conditions alter your requirements or the time when workers are needed.

Each state has its own farm placement supervisor who is in charge of the labor program for the state concerned. Edward F. Hayes is chief of the Farm Placement Service for California, Joseph D. Wilson for Oregon, John W. Grant for Washington, and George R. Gouchnour for Idaho.

In addition to the state offices, there are local offices to serve the needs of growers. In Idaho, Washington, and Oregon there are 75 regular full-time local offices and 56 farm labor offices operated on a seasonal basis. In California some farm labor offices are located in trailers which are hauled to strategic spots to give quick service to growers.

Growers with good labor camps get the most reliable supply of migratory help. In Washington state more than half of the orchards can provide sleeping and eating accommodations for its harvest crew. The tumbledown shack has given way to streamlined housing with hot showers, and spic and span cafeterias provide meals at less than cost. In Imperial County, California, the K. K. Sharp ranch near Holtville goes so far as to have air-conditioned housing units.

How important housing has become to growers is shown by the amount of housing construction. From September, 1950, to September, 1951, over a million dollars was spent in seven counties in the San Joaquin Valley for new housing and additions including shower baths with hot and cold running water, cement floors for tent housing, and substitution of concrete block housing construction for tents.

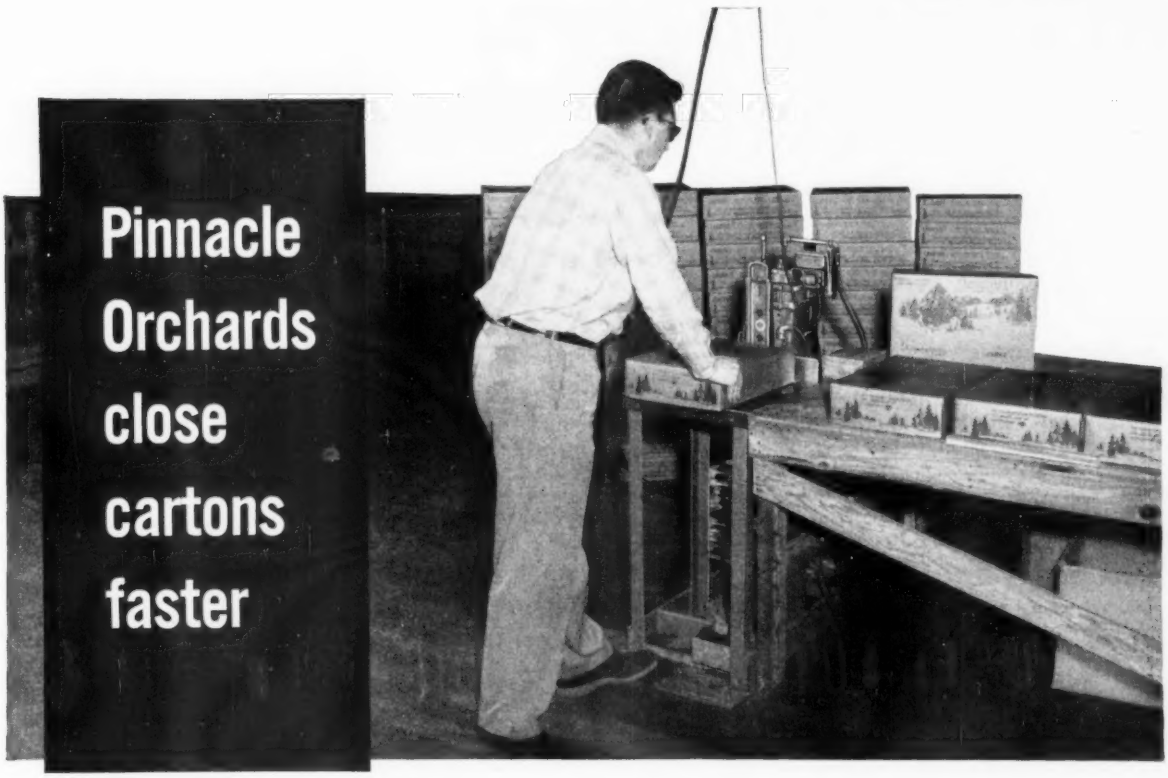
A big obstacle to more rapid construction of farm housing is the short period of use in relation to the high cost. Some growers get around this by building units which are designed for more than one use, such as farm machinery sheds which can be converted into dormitories.

Day-Haul Workers

Many growers work with the Farm Placement Service in establishing day-haul programs. Workers who take part in day-haul programs are mostly women and boys who do best in berry harvest and such lighter types of work. In 1952 day-haul operations were conducted in 100 northwest cities. Many thousands of workers not normally available were added to the farm labor force. In Idaho, over 1,000 Navajo Indians were recruited for harvest help. A Washington grower recruited Indians from Montana. In California 50 Navajo Indians were employed in San Bernardino County.

Other types of workers who have been used in a pinch include soldiers from nearby camps, high school boys and girls, business employees, preparolees from state reform schools, and in some cases county officials have released prisoners.

It is expected that Mexican Nationals will again be imported for farm work in 1953. Local Farm Placement offices will give growers information regarding the legal employment of these workers. Mexican Nationals can be brought in only when all available sources of domestic labor have been exhausted. In 1952 only one and one-half per cent of the hired farm labor force in the Northwest was Mexican Nationals, but they gave the extra push which helped save the crops. THE END



Pinnacle Orchards close cartons faster

with International Stapler

Pinnacle Orchards, Medford, Oregon, growers and packers of fine fruit . . and nationally known for the famous, "Fruit O' The Calendar Club" gift boxes are enthusiastic users of International Stapling Machines. They report better closures, higher production, lower costs, reduced fruit damage, less pilferage, and better working conditions. Here's what Dan Hull, Pinnacle's assistant manager has to say about International Stapling Machines:

"We purchased our International Stapler late in 1951 and are very pleased with its performance and resulting rapid, efficient closing of our gift boxes and the considerable savings in packing costs.

"Prior to 1951 we used four men to close our gift boxes . . since 1951 we've increased our daily production and use but a single operator for a shorter period of time than was required for any one of the four previous operators.

"Damage to the fruit during the closing operation is negligible and has been reduced since we do not have to turn the box over to close it . . nor do we have to exert extra pressure on any portion of the package. We believe this closure has lessened the amount of pilferage which can occur in transit.

"Another desirable feature of the equipment is its portability. We pack and ship from various areas of the Pacific Coast and move our stapler from place to place in a pick-up truck."

From coast to coast, more and more fruit and vegetable growers are closing their cartons better, faster and at less cost with International Stapling Machines. Ask for Bulletin C/201.

Package for profit . . use International Staples for faster, finer closures

a seal of security — **INTERNATIONAL STAPLERS**

International Staple & Machine Company
800 East Herrin Street, Herrin, Illinois

Fighting VIRUSES *in* OREGON ORCHARDS

Every grower should plant only registered nursery stock to stop the spread of viruses in stone fruits

VIRUS attacks on stone fruits cost Oregon growers many thousands of dollars each year. Not much is known about these tiny destroyers—so small they can't be seen through an ordinary microscope—but plant disease scientists estimate there are between 40 and 50 distinct virus diseases in North America. Nearly half of these are known in Oregon orchards.

The viruses found in Oregon stone fruits react in different ways. Some have no visible effect except in reducing yields and quality of fruit. Their unseen action saps the strength of the tree. Others, such as Western X disease of peach and Western X little cherry and albino disease of cherry actually destroy trees and orchards and can be readily identified.

Unlike insects or diseases, virus diseases cannot be eliminated once they infect a tree. The only recourse is to cut out the tree. In nature, viruses are commonly spread by insects which feed on infected plants, take some of the juice containing the virus, and infect healthy plants. Or they can be transmitted in the nursery by using stocks or budwood which is virus infected.

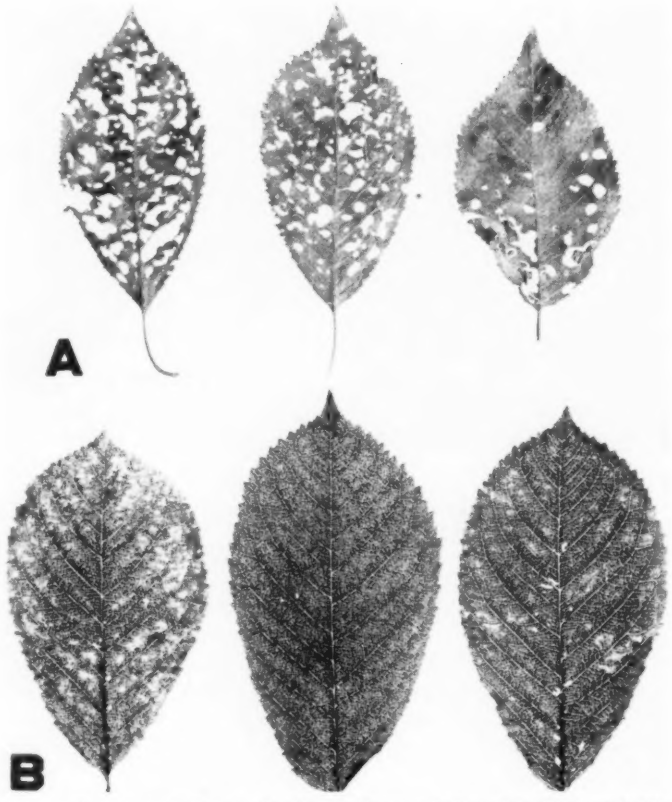
A survey of trees used as sources of propagation stock emphasized the seriousness of the problem in Oregon nurseries. It was found that satisfactory two-year-old stock often was infected with destructive viruses which did not make an appearance until after the tree was established in the orchard. Also, nurserymen, unfamiliar with viruses and their symptoms, had no means of selecting disease-free propagating stock.

In 1944 a virus control program was started in Oregon nurseries and orchards with the purpose of selecting virus-free sources of budwood especially for sweet and sour cherries which are affected more seriously than other Oregon stone fruits. Individual trees were selected which showed no visible virus symptoms, and they were registered in a permanent book. These trees were carefully inspected each year and used as sources of virus-free scion wood for nursery propagation.

This method of registering helped eliminate those viruses with visible symptoms. To eliminate trees with invisible viruses a method of indexing for virus was established. Indexing takes advantage of the fact that whereas the virus will show no visible symptom on one fruit variety it will be readily apparent on another more susceptible kind of tree. For instance, the primary virus searched for in stone fruits is the ring spot virus which does not always exhibit visible symptoms. However, when it is inoculated in certain other indicator plants it is readily distinguished.

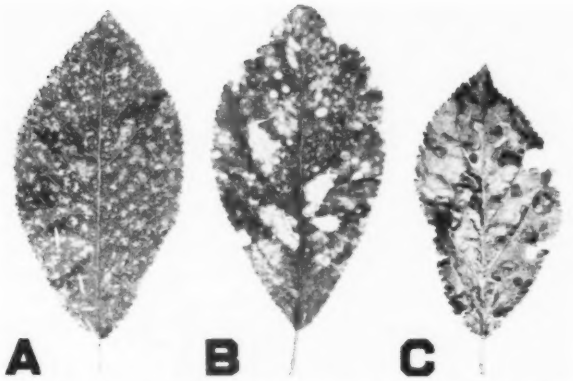
By visual inspection and then by the use of indicator plants, completely virus-free trees were located and from these trees virus-free scion wood orchards are being established. Over 300 varieties of cherries are being tested along with several varieties of plums and prunes. Since there is no serious problem with viruses on peach trees in Oregon they were not included in the study. Following are listed selections of some common varieties of cherries recommended for planting:

For the Bing variety of sweet



Leaves from sweet cherry showing evidence of virus infection, probably the more severe strains of ring spot virus. A) Leaves showing the lace leaf or tatter leaf condition. B) Center leaf shows no visible virus effect by transmitted light while two outer leaves show a mild mottle.

The data in this article as well as the photographs are presented through the courtesy of J. A. Milbrath, plant pathologist, Oregon State College, author of Station Bulletin 522 entitled "Selecting Stone Fruit Trees Free From Virus Diseases," which is available upon request from the Agricultural Experiment Station, Oregon State College, Corvallis, Ore.



Virus-like abnormalities on Italian prune. A) Rusty mottle type of foliage discoloration. B) Necrotic spotting and chlorotic mottle on same leaf. C) Necrotic spotting of prune leaf spot.

A series of Montmorency cherry leaves is shown here with various types of necrotic ring spots and necrotic areas which have resulted from a first-year invasion of the ring spot virus.

cherry the following selections which are completely virus-free are recommended: B260, B293, B294, B86, B62, and B525.

For the Royal Ann or Napoleon variety the following selections are recommended for propagation: A10, A114, A201, A202, A203, A204, A318, and A501. Of these trees only the A10 has been indexed free from the ring spot virus; the others show a mild strain.

With the Lambert, only four selections are recommended: L89, L313, L314, and L315. None of these trees are completely free of virus. However, only a mild ring spot reaction was evident. Recently a Lambert has been obtained from Missouri which has been reported free from ring spot virus.

Seven selections of Black Republican are recommended which do well but show a mild ring spot virus reaction: R257, R316, R332, R468, R467, R466, and R504.

The best Black Tartarians are: T261, T391, T349, T388, and T481.

For Montmorency sour cherry the following should be planted: M252, M322, M460, M461, M464, and M505. All these selections have tested out virus-free.

Comparison in height of virus-free Royal Ann (A10) on the left with ring spot virus infected Royal Ann (A11) on the right.

Comparison of growth of virus-free Royal Ann (A10), left, with ring spot virus infected Royal Ann (A7), right, in nursery.

The next step in the Oregon virus program is to certify disease-free stone fruit nursery stock. Stone fruit trees could be divided into the following grades:

1) Purple tag foundation grade: indexed virus-free stock grown on seedlings from indexed virus-free seed trees.

2) Blue tag certified grade: indexed stock of known virus history grown on seedlings from any available source.

3) Red tag commercial grade: scion wood not indexed but from registered trees free from visible symptoms of serious viruses.

Since there are some varieties for which no virus-free trees have been found and there are not sufficient virus-free seed trees to go around, not all stock could qualify for the foundation grade. The certified blue tag would be essential and certification would be based on the best stock available. THE END

The growth of virus-free Montmorency cherry trees as compared with ring spot infected Montmorency in nursery row. Trees on the left are virus free and trees on the right are infected with ring spot virus.

MACHINE SPEEDS APRICOT CUTTING

By A. McCALL SMITH

Al Bonturi has realized his fondest hopes. He has seen his apricots fed automatically through a machine that halved them and removed the pits.

It all started back in 1943 when apricot growers wished they had cabbages or guinea pigs. The season was close at hand and the usual war of nerves was going on between growers and canners.

Farm Adviser Roy McCollum had called a meeting of San Benito County apricot growers to discuss the situation. They came with long faces. Many would have got out of apricots that night if there had been a way. No happy solution had come out of the meeting when the farm advisor said, "Wouldn't it be wonderful if we had a machine that would cut apricots?" No one commented, but Al Bonturi remembered that remark.

A short time later some of the same growers were present at one of the monthly roundtable meetings held at the Bonturi orchard. Ralph Parks, extension engineer, was the guest speaker. After the evening discussion, Parks urged the growers to take their engineering problems to the University of California.

"Why don't you make us an apricot cutter?" It was Al Bonturi, and he laughed.

Parks suggested that Bonturi take a delegation of growers to Davis and discuss the problem with Roy Bainer, head of the department of agricultural engineering. Shortly Bonturi appeared on the campus with Paul Rentfrow, Carmen Lomanto, John Lomanto, and Joe Bua.

They wanted an apricot cutter that would pit five tons daily. They wanted to dump the apricots into the hopper a field box at a time, not feed them in by hand. They wanted it to cut good cots and they would throw away the little ones. It was not to cost over $1,000. This was not going to be easy.

Direction of the project was placed in the capable hands of engineer Coby Lorenzen, Jr., and Lloyd H. Lamouria took over the problem of feeding.

How Machine Operates

This is what Al Bonturi saw at his own orchard this season: The apricots were dumped, box at a time, into a hopper partially filled with water. As the water flowed out of the hopper it carried the apricots along and onto a rubber belt with cups large enough to receive one apricot each. A jet of water forced up through the cup placed the apricot in a free-floating situation where suture was horizontal. The belt carried the fruit between two drums that held it in position while it was cut in half by knives. Then a plunger forced pins through the halves to push out the pits. The halves were then released to slide down a steel chute to the trays.

While only $300 worth of materials was necessary for construction of the cutter, engineers had already devoted 7,000 man hours toward its perfection. It operates with two-thirds h.p. of electric energy.

One hundred of Bonturi's neighbors were present and the cutting shed buzzed with their enthusiasm. Today they were seeing a machine cutting 180 apricots a minute.

This was the second model the University of California had tested at the Bonturi orchard before the critical eyes of men who knew what they need. Bainer explained to the crowd that the machine was still in the experimental stage.

And Al Bonturi expects that he and his neighbors will stay with apricots and cut them mechanically. The same method may be used to cut peaches for drying. THE END

SUCCESS IN WESTERN ORCHARDING

By BOB ADAMS
As told to Harold and Lillie Larsen

It's better than it was in the good old days—but there's a lot of the old in fruit growing that still holds good in this age of mechanized production, says Bob Adams, who has been growing prunes all his life in Oregon's Willamette Valley and now is adding cherries. — Ed.

I CAN scarcely remember the time when we didn't have an orchard. My father set out an Italian prune orchard here on this Orchard Heights road, about five miles out of Salem, in 1906, and around 1920 I took it over. This orchard is still bearing well. How long an orchard will live and bear is all in how you take care of it.

Years ago orchardists used to plant fruit trees too close together. I pulled out every other tree in our orchard—the trees are now 40 feet apart—and those left are giving as much fruit as, and of better quality than, the entire orchard did before.

We have our own prune drier and after the prunes are dried we send them to Forest Grove to the dried prune co-op, one of the last of its kind in Oregon.

And speaking of drying prunes, this is a job done much better now than in the good old days. Almost any kind of prunes used to go into the drying trays. Now we are very careful that only the best quality of prunes is dried.

One reason the prune market is on the dark side today is that Germany, which used to buy thousands of tons of prunes before Hitler took over, no longer has the money to buy them. All the European prune markets are practically gone. If we could get back this European trade our prune growing would be sitting pretty again.

Peak prune growing in Oregon was in 1930 when we had 56,800 acres. There is less than 25,000 acres in the state now.

But if I were a young man, I'd plant cherries rather than prunes here in the Willamette Valley. In fact, I did plant five acres of Black Mazzard rootstock a year ago which I will top-graft next year. It will take around eight years before the trees become a good commercial orchard. I'm going to get the virus-free scions from nurseries and not graft from my own Royal Anns.

I'm planting the Royal Ann rather than the black cherries such as Bing and Lambert because most of our production goes into brining cherries and the darker they are the more they have to be bleached.

Cherries need a well-drained, fertile soil. I use from 100 to 150 pounds of nitro-prills (33 per cent available nitrogen) to the acre, then I cover crop with oats and vetch which are turned under in April. With plenty of humus erosion is no problem.

The soil should be disked the same depth each year. If you disk shallowly for a time, then disk deeper, you cut off the feeder roots. I usually disk about six inches deep.

I've considered planting a permanent cover crop, but if you don't cultivate and feed your orchard, you'll find you lose trees. Cherry trees have to be tended very carefully to keep them paying.

You hear a lot of talk against the professional fruit pickers—those who move from state to state or area to area. Personally, I find them much better than many of the "home pickers." The former have a real pride in their job. They don't break off your new fruit spurs (they want a crop to come back to next year). They also are much faster and more careful with your ladders and the limbs of the trees.

And just remember, no matter how long you have been in the orchard business, you've never been in it long enough to learn everything. It pays to watch out for the new improvements—but don't take everything just because it is new. There's a lot of the old in fruit growing that still holds good.

Pacific

NEWS AND VIEWS

PREDICTING HARVEST DATES

SOME years ago California cling peach growers decided it would be a distinct advantage if they could predict the date their fruit would mature. They voted money out of their own pockets and Dr. Davis at the University of California undertook the study.

Davis cut thousands of immature fruits and finally discovered that from the time the tip of the pit in the green peach started to harden to time of full maturity was essentially the same number of days each year. In this manner he was able to predict with considerable accuracy the ripening date of cling peaches.

This information is equally valuable to all fruit growers and a statewide survey is now underway to provide this same service to growers of other fruits. The approach will be a little different. The university has asked certain growers to keep records of the date of full bloom and the date of first picking. At the same time weather records will be kept. The correlation between the time from bloom to picking with weather conditions will in a few years provide a valuable method of predicting maturity dates in the future.

Weather is a big influence. In two adjacent counties the same variety of apricot trees bloomed only four days apart; however, the trees that bloomed the latest were picked a month earlier.

O. C. Frogley of the Keizer area, near Salem, Ore., reports that frost alarm equipment can be installed on individual farms at a reasonable cost. For about $60 the farmer can buy a pair of minimum recording thermometers, an alarm thermometer, an alarm box and battery, and rubber-covered wire for connections. Frogley has used this system in his strawberry fields for several years. When the temperature drops, he turns on his sprinkler irrigation to lay down a protective ice sheet in the strawberry fields. He adds that he has saved many a crop while neighbors across the road, using no frost protection, have suffered losses.

Constant vigilance and effort are necessary to slow down the spread of insects and diseases. Despite quarantines and up-to-date spray schedules, however, the inexorable march continues. Latest report is that for the first time flyspeck disease of apples has been reported in Santa Cruz County, California. The symptoms appear on the fruit as smallish black semicircular specks. Observations by Farm Advisor Edward C. Koch indicate that the disease could have serious consequences especially during periods of high humidity in the coastal region.

Expanding industry continues to cut into orchard land. In southern California 25,000 acres of citrus groves have been bulldozed out and the land turned into factory and residential building sites.

Thirty acres of old prune orchards are being taken out on the John Norwood estate at Brush College, near Salem, Ore. The oldest part of this orchard was planted 50 years ago, and the later trees were set in 1922. Albert Bouffler, manager of the estate, is removing the prune trees and will seed the acreage to grain.

The consumer likes strawberries the year around. Reports from California show that half the commercial crop is now frozen. California's frozen pack of strawberries has climbed from four million pounds in 1946 to 59 million pounds in 1952. One-third of the national production is frozen. Home freezers and the extensive retailing of frozen foods have provided a new market for this highly perishable crop, and by spreading the marketing season the stability of the industry also has been advanced.

BEES PROVE PROFITABLE

Charles Reed operates a small citrus grove in Orange County, California, and finds his bees have become the tail that wags the orange farming end of his business. Reed was a mechanic but retired 11 years ago because of ill health. His 2,200 colonies not only work his own orange grove but are rented out to fruit growers. About 70 per cent of Reed's bees are rented to Kern County areas for pollination. Beeswax, honey, and oranges are marketed by Reed. He figures expenses per bee colony add up to $10.65 when labor, truck hauls, repairs, supplies, taxes, and utilities are all figured into the deal. Reed's mechanical background has enabled him to cut costs with an electrical loading hoist which he built to make fast and easy moving of bees in and out of his truck.

HANDY ANDY

W. D. Koenecamp of Zillah, Wash., is proud of this cultivating equipment that he designed which cultivates and ditches at the same time. The culti-cutting device in front of the ditcher is geared to run just a little slower than the forward motion of the rig. In this way it gouges out the weeds and grass and leaves the trash on the soil surface.—W. A. Luce

The Orient is to be searched this spring and summer for parasites to control citracola scale on citrus in California. Curtis P. Clausen is now en route from the Riverside Citrus Experiment Station to Japan and India.

NUT GROWERS SQUEEZED

Few Contra Costa County, California, walnut growers played hookey from the one-day walnut school, held at Brentwood, for 127 growers jammed the Methodist community hall to hear the program arranged by County Advisor Milt Bell. There are plenty of problems facing walnut growers. On the west and north sides of the county, growers are caught between high taxes and real estate bidders in a squeeze of population growth that is taking its toll of fine old orchards. Big industry is creeping up from the San Francisco Bay to Stockton and taking waterfront and trackage along the two railroads as well as land for homes and subdivisions.

Costs of production are as low in the Contra Costa area as in other walnut producing areas of the state, but growers must decide to take a lower rate of interest on their investment if they stay in business and pay the higher taxes. Not only are industry and home builders forcing farmers to immediate decisions but plans for more roads, including freeways, are cutting off important producing land.

Demand has been keeping pace with supply of walnuts, however, but only walnuts have stood up to this level in the nut field, the school was told. Competition has had to shell more and more nuts while the in-shell demand for walnuts has been good. But growers are anxiously scanning the horizon as a production of 78,000 to 80,000 tons for 1958 is predicted. Last year's walnut production was 72,000 tons for California. If the purchasing power of the United States consumer continues high, the prospect is good. Coal or steel strikes always raise hob with walnut demand as Pittsburgh and other coal and steel areas are big nut consumers.

Kenneth A. Brown, who, so far as good farming is concerned, is walking in the footsteps of his illustrious father, the late Sam Brown, completed the removal of 30 acres of 30-year-old filbert trees at his 200-acre ranch near Gervais, Ore., in early April. While admitting the orchard was still bearing "real well," Brown also said the reason for the removal was "quite obvious," adding that "with the cheap imports, raising filberts doesn't seem to quite pay."

However, Brown has another 30-acre orchard which is but 15 years old and lovely to look at. The Browns are one of Willamette Valley's old filbert families. There have been commercial filbert orchards on the Brown farm almost as long as there have been commercial orchards anywhere in Oregon.

CRACKING GOOD PLANT

Cracking nuts at the rate of a ton an hour fascinated hundreds of nut growers, who inspected the newly opened central marketing plant of the Northwest Nut Growers Association in Portland, Ore.

The electric walnut cracker, which John E. Trunk, general manager, explained was the only one of its kind in the world, was viewed largely through peep holes in the walls of the house confining it. In a fraction of a second an electrical impulse of 65,000 volts at 5,000 amperes shatters the walnut shells from the nuts which are fed from storage bins over two lines of nine nut cracking units each. Both nut meats and shells are moved in sanitary cup conveyors along an underground tunnel to another building for shell extraction and sorting of meats.

Eight packaging machines produce the colorful one-pound Cellophane packages of the co-operative Blue Pirate brand filberts and walnuts as well as Cascade and Omega walnut brands. At 20 sorting tables the nut meats are separated into three grades. The plant puts out 210 different packs of walnuts and filberts.

A feature of special interest to the growers was the special heating and boiler system which permits use of nut shells as fuel. No other fuel is used in the plant.

Directors of the Northwest Nut Growers Association are Walter Russell and L. R. Maloney, McMinnville; Russel Lehman, Dayton; C. L. Sersanous, Portland; John W. Graham, Sherwood; John Mulloy, Hillsboro; F. B. Harlow and Arthur Quackenbush, Eugene; Frank Bartholomew, Springfield; Harry L. Pearcy, Salem; and George G. Cadwell and Harold Quick of Chehalis, Wash.

Filbert growers in the area north of Salem, Ore., are applying a special spray or dust for the control of filbert leaf rollers this year. The leaf rollers have been found in orchards near Woodburn, Aurora, and other communities in the north end of the Willamette Valley for at least two years. A year ago the pest was reported in orchards from Pratum, Hazel Green, and other districts just east and west of Salem. Since the insect appears to be gradually moving south, all growers in the Willamette Valley are on the alert for it.

A recent report to Willamette Valley growers, from Robert W. Every, entomologist, says the overwintering eggs of the leaf rollers started to hatch in late March. They feed on the buds and leaves usualy where two leaves are in contact.

Several insecticides have been tested for leaf rollers in the Willamette Valley during the past couple of years. To date, DDD (Rothane) has been giving the best control.

A vineyard with some vines as old as 15 years is owned and operated by John S. Quaschnick in the Lodi district of California, where both table and wine grapes are grown extensively. John came from North Dakota in 1919 to join his father on a 20-acre farm in the days of horse farming and long uphill battles to hang on and pay taxes, raise a family, and eat regularly.

Half the acreage was in grapes and half in alfalfa at first, but gradually it was all put to grapes and an additional 10 acres added. For years the land was double cropped with barley and pinto beans. Four varieties of grapes are now grown—Zinfandel, Alicante, Tokay, and Carignane. Three sons farm with Mr. Quaschnick, one about to finish high school and one recently returned from a hitch in the Army in Korea.

Washington growers will welcome back Dr. R. M. Bullock who is leaving his position as head of the department of horticulture at Utah State College to join the Southwestern Washington Experiment Station at Vancouver. At the same time it is announced that Dr. E. S. Degman of the USDA at Medford, Ore., will take over the position of horticulturist at the Tree Fruit Experiment Station at Wenatchee.

GIVE APPLES A LIFT

The USDA estimates that in Washington state alone between 125 and 140 apple packing and storage houses could reduce their total costs of handling from $70,000 to $100,000 annually and free from 200 to 400 men for other work during the critical harvest season by using the mechanical lift method for high-piling and breaking out high-piled boxes of fruit. To these benefits should be added the value of maintaining the quality of the fruit through more gentle handling.

Two big fruit meetings are scheduled for the West Coast in 1954. California growers will play host to the National Peach Council at Fresno, February 15-17, 1954. Charles Pruess, Fresno fresh peach grower, is president of the council. The International Apple Association will meet in Yakima, Wash., probably during the last week in August, 1954. President of the apple group is M. E. Knouse of Peach Glen, Pa.

Sprinkler irrigation continues to gain friends among growers. Latest estimates by the Bureau of Census, which are for the year 1949, show that California has 181,000 acres irrigated by sprinklers, Oregon 99,000, and Washington 68,000. The figures for 1953 would be considerably higher. Lately there has been a consolidation and rearrangement of many of the companies that sell irrigation systems. In this connection it is interesting to note that John Muller, who installed the first sprinkler system in Tulare and Kern counties, California, is the new San Joaquin Valley representative for the Farmland Irrigation Company. A pioneer with sprinklers, Muller is now in a position to offer the knowledge gained from his experience to a much expanded area.

HELPING THE PRUNE

No California fruit has so many unsolvable problems as prunes, it seems. Exports of prunes are down to 15,000 tons from the war and postwar peaks. The U.S. consumer is eating less prunes, and the dark, wrinkled "poor relation" in the fruit industry lacks eye appeal to the consumer beset by an inflated food dollar.

John Kilbuck of the University of California food technology department told growers at the fifth annual Prune Day held at Davis, "I stood behind the chow line waiter and watched him dish up the rations to the hungry fighting men in Korea and saw only one out of nine men ask for a helping from the big tub of prunes. When a soldier spoke that word 'prunes,' he always got a lot of off-key comments from his buddies around him in the line. The prune as offered the soldier just had no appeal in color, shape, or flavor, it seems.

"There is not enough dehydrator capacity," he continued. "The shorter the time on the ground for the prunes after shaking, the better."

No one brought up the question of why the USDA Regional Laboratory at Albany, Calif., shouldn't work out some "face lifting" on the lowly prune to give it bright color and better flavor to tempt the color-conscious consumer.

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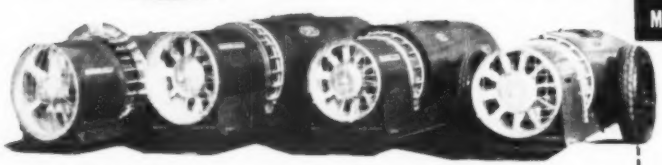

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WASHINGTON FRUIT LETTER

- **FTC Dismisses Charges Against Appalachian Growers**
- **Outlook for Exports is Brighter Now**

By LARSTON D. FARRAR
Washington Correspondent, American Fruit Grower

THE Federal Trade Commission has dismissed completely the charges brought by the agency's attorneys last fall against Appalachian Apple Service, Inc., an association of growers with headquarters in Martinsburg, W.Va., and five processors in Virginia, West Virginia, and Pennsylvania.

FTC examiner Frank Hier ruled that there was not sufficient evidence to support any of the three charges—namely, price-fixing, and maintaining of prices to be paid for raw apples; establishing a mathematical percentage price formula for the different grades, and diverting raw apple shipments from one or more processors to others to bolster prices.

More than 2,000 pages of testimony were gathered during a series of hearings, which began on November 17, on the complaints filed by the FTC. Hearings were held in Washington, Martinsburg, W.Va., and Charlottesville, Va.

Concerning the price-fixing complaint, Mr. Hier said:

"Considering the record now as a whole instead of piecemeal, the examiner is of the opinion that there is insufficient reliable, probative and substantial evidence to sustain the charges. . . .

"There is no doubt from (certain documents) that the Appalachian Apple Service secretary wanted to fix, stabilize and maintain prices, urged it and may have thought he achieved it—but stubborn and unquestioned facts belie it, in the examiner's opinion."

As to the pricing formula charge, Mr. Hier said that no *prima facie* case has been made to support the complaint. As to the charge of diverting the marketing of apples, he declared that "the evidence is at least conflicting, contradictory and far from clear as to any agreement to divert . . ."

THE outlook for a better export business in fruits—particularly in apples and pears—seems to be brighter as a result of changes being made both in the USDA and the U.S. Department of State, due to the new administration.

Secretary of Agriculture Ezra Taft Benson has abolished the Office of Foreign Agricultural Relations, replacing it with a new Foreign Agricultural Service. He has said that the nation will make an aggressive new move to develop foreign markets for more than a billion dollars worth of surplus farm commodities (inherited from the previous administration) and to increase the sale of all American farm products that want an export market.

Senator Karl E. Mundt (R.-S.D.) is a co-sponsor with Senator Clinton P. Anderson (D.-N.M.), former secretary of agriculture, of a bill to establish a Foreign Trading Division to sell, barter, or exchange in foreign countries the nation's surplus farm commodities. They propose a half-million dollar fund to operate this division within the Commodity Credit Corporation.

Intensive study is being given to possibilities of increasing fruit exports in both the Executive Department and in Congress. The Senate Committee on Agriculture, headed by Senator George D. Aiken (R.-Vt.), has begun hearings on agricultural policy, with emphasis on the export situation. Both Truman Nold, executive secretary of the National Apple Institute, and Ernest Falk, secretary-manager of the Northwest Horticultural Council, are scheduled to testify in mid-May.

THE farm population of the U.S. dropped by roughly 5.5 million, or 18 per cent, between 1940 and 1950, the Bureau of the Census, U.S. Department of Commerce, has reported.

The estimate for April, 1950, was 25,058,000, according to the bureau. In 1916, just before the U.S. went into World War I, the nation's farm population was 32.5 million. Meantime, the overall population of the nation continues to gain by leaps and bounds. The "population clock" at the Department of Commerce here showed that the nation passed the 159 million mark in March. This means that fewer than one out of six persons in the country now are on farms, as compared with better than one out of three only 40 years ago.

The ones who are on farms today live better, eat better, and have more mechanical help—in and out of the house—than their parents, or grandparents, however.

OLD VARIETY ORCHARD

THE exigencies of our present-day methods of distribution have limited the number of apple varieties grown commercially to a few which have the necessary qualifications for handling and shipping. For example, over 75 per cent of all commercial apples produced in the northeastern part of our country are of the McIntosh variety. As a result of this concentration on a few varieties many of our old apple varieties are disappearing.

It is for the purpose of preserving some of these old varieties, many of which originated in New England, that the Worcester County (Mass.) Horticultural Society is establishing an old variety experimental orchard at North Grafton, Mass., on the farm of S. Lothrop Davenport, secretary of the society.

This project, according to Allen W. Hixon, president of the society, will not only preserve these varieties for future generations but will furnish fruit for exhibition and educational purposes such as identification and judging at county agricultural schools and agricultural departments.

The project also will furnish scions to anyone interested. The plan will make available, too, foundation stock for future apple breeding programs.

In planning the orchard, a list of about 60 desirable apple varieties was prepared by the pomology department of the University of Massachusetts in co-operation with the New York State Agricultural Experiment Station at Geneva and for the past few years stock of many of these varieties was budded or grafted on Malling VII dwarfing stock.

About 50 of these trees are now growing in the orchard at North Grafton. The balance of the varieties which are to be grown in the orchard will be set as soon as stock can be located. A few scions of some of the varieties are available for distribution this year.

Following is a list of varieties which will be included in the old variety orchard; those with an asterisk have already been set.

List of Old Apple Varieties in Experimental Orchard at North Grafton, Mass.

Alexander	Palmer Greening*
	Porter
Baldwin	Primate*
Ben Davis*	Pumpkin Sweet*
Benoni	
Black Gilliflower	Ramsdell Sweet
Blue Pearmain*	Red Astrachan*
	Red June
Chenango*	Ribston*
Cox Orange	Rhode Island Greening*
Dutchess of Oldenburg*	Roxbury Russet*
	Smokehouse
Early Harvest	Sops of Wine*
Esopus Spitzenburg*	Sutton*
	Sweet Bough*
	Sweet Winesap*
Fallawater	
Fall Pippin*	Tolman Sweet
Fameuse	Tompkins King*
	Twenty Ounce*
Golden Russet	
Gravenstein	Wagener*
Grimes Golden	Washington Strawberry*
Hubbardston*	Wealthy*
	Wellington Bloomless
Jonathan*	Westfield*
Lady	White Pippin
	Williams*
Maiden's Blush*	Wolf River
McIntosh*	
Mother	Yellow Bellflower*
	Yellow Newtown*
Nodhead	Yellow Transparent*
Northern Spy*	

NUT GROWERS NEWS

The Rev. Paul C. Crath

HORTICULTURISTS everywhere and particularly those interested in the growing of hardy nut trees will recognize in the death of Paul C. Crath on December 24, 1952, the passing of a man who contributed much to the progress of establishing hardy nut trees in northern United States and Canada.

Born in the Ukraine, Mr. Crath came to Canada as a young man. He graduated in theology at the University of Manitoba and much of his life was spent as a missionary in western Canada and Poland.

In 1917 Rev. Crath visited Toronto where he was impressed by the fact that although the climate was much like that in parts of the Ukraine and Poland there were no plantings of the English or Persian walnut. This started him on a quest in his native land for superior Persian walnuts for introduction into Canada and northern United States.

First Planting in 1923

It was not until 1923 that trees were brought in from western Ukraine near the Carpathian Mountains and planted near Oakville, Ont. Other lots of trees and seed nuts were imported in 1926 and 1929. Distribution of the trees was aided by the late James Neilsen and the Wisconsin State Horticultural Society.

The -45° F. temperature in the Ukraine in 1929 destroyed many trees so that the survivors were of proven hardiness. And in 1933-34 the extremely cold weather in North America provided a severe test for material already brought in. In 1934 an expedition, financed by Carl Weschcke of Minneapolis, collected many grafts from superior trees and 1,200 pounds of nuts which were brought back for planting in Minnesota.

The chief difficulty experienced with Crath Carpathian walnuts is their tendency to vegetate early in the spring with the result that the new growth is killed by late spring frosts. At present many trees are fruiting and two contests have been organized to locate the best trees. Some varieties already named and being propagated are Littlepage, Metcalfe, and Colby.

The Northern Nut Growers Association recognized the work of the Rev. Paul C. Crath by making him a life member of that association.—*L. H. MacDaniels, Director, Northern Nut Growers Assn., Ithaca, N. Y.*

CAPTAN FUNGICIDE

(*Continued from page* 16)

In the years following this first year of testing, Captan has been shown to be effective against many apple diseases including scab, Brooks' fruit spot, bitter rot, and black pox. Reports from Indiana are that it is effective against black pox and Botryosphaeria rot, and data from the Hudson River Valley in New York indicate that it is also effective in the control of cedar rust. It seems to be a little weak, however, in the control of the sooty blotch disease.

In New Jersey experiments, using Red and Golden Delicious, Stayman, Twenty Ounce, and Grimes Golden varieties of apples, the Captan blocks have always been outstanding for their fine finish. In several experiments the amount of Stayman cracking also has been reduced in the Captan blocks.

Captan-sprayed trees also have shown a tendency towards increased yields. Whether this trend will be maintained must await further experimentation.

In tests conducted during 1949, a summer oil emulsion (stickers) was used with Captan and this combination caused heavy defoliation of Rome foliage. An oil-Captan combination, therefore, is not recommended.

Fruit of Fine Finish

The apple industry in the East and Middle West sorely needs a pesticide schedule that will permit good yields of fruit of fine finish in order to compete successfully with western applies. It appears that Captan is a big step in that direction.

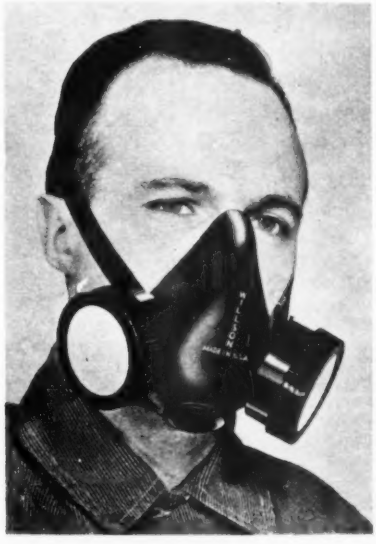
In peach disease control experiments, Captan has been equal or slightly superior to sulfur for the control of brown rot. It is the only non-metallic organic fungicide used in extensive tests conducted in New Jersey that has assisted in the control of bacterial spot. Where used at four pounds per 100 gallons, it has equalled zinc sulfate-lime sprays in the control of this disease.

We are in need of a fungicide that not only will control brown rot but will do a good job against bacterial spot as well and at the same time be compatible with such insecticides as parathion. It may be that the price of Captan at some future date will permit it to fill this need.

Reports from South Carolina indicate that Captan may fill a need, in higher temperature areas, as a peach fungicide. According to these reports Captan-sprayed peaches show better color than peaches sprayed with our most common fungicides. THE END

10 RULES FOR PROTECTION WHEN SPRAYING

SOME of the newer organic sprays such as parathion and TEPP are not only tough customers on bugs but will deal a knockout blow to the man behind the spray gun if he doesn't take precautions. The safety record of growers using these new highly toxic materials has been remarkably good, but constant vigilance is necessary to avoid accidents.



Above—Willson Agrisol respirator. Right—Mine Safety Farm Spray respirator. Both are equipped with two chemical cartridges and filters for use in light concentrations of most organic insecticides. Special filters are needed for HETP, TEPP.

Continued use of such sprays with seemingly no ill effects often results in a careless attitude on the part of the user. Materials such as the organic phosphates affect the nervous system and are cumulative in effect. They can be absorbed by the human system in light concentrations for hours or even weeks before causing serious symptoms.

Therefore, when you are filling the spray tank, disposing of empty spray cartons, or whenever you are exposed to even small amounts of insecticide continuously during the day or for succeeding days, observe the following 10 rules for safe handling:

The Rules

1) Use a respirator with filters and cartridges especially designed for use against agricultural insecticides. Bear in mind that for HETP and TEPP a different type of filter and cartridge is necessary than the type recommended for parathion, EPN, aldrin, dieldrin, chlordane, and nicotine. Don't use a simple dust respirator which will give you a false feeling of security.

2) Change respirator filters twice a day, or oftener should it become difficult to breathe.

3) Change respirator cartridges after eight hours of actual use, or oftener if any odor of insecticide is detected.

4) After use, remove filters and cartridges and wash face piece with soap and warm water. Rinse thoroughly and dry face piece with clean cloth, uncontaminated with insecticide.

5) Remember that a cab or umbrella over the tractor operator will ward off spray drift but is not a substitute for a respirator or protective clothing.

6) Protect your eyes with goggles or face shields.

7) Wear genuine rubber gloves—not synthetic—of either the gauntlet or inverted cuff type. Wear wet weather garments of rubber. Boots should be of rubber since canvas and leather take up and hold many of the pesticides.

8) Arrange with your physician to have a supply of atropine on hand for emergency use as an antidote.

9) Follow a standard washing schedule after spraying. Wash hands, arms, and face immediately after finishing spraying. Change coveralls, socks, and underclothing each day.

10) For applying insecticides, including aerosols, in greenhouses or when formulating or mixing insecticides in poorly ventilated spaces, use a full-face gas mask with approved-type canister. THE END

Eastern Groups Unify Efforts

ACTION to unite the fruit industry on fundamental issues has been taken by eastern fruit growing areas and it is hoped the six policies agreed upon in the recent meeting in New York City will eventually receive industrywide support. The groups represented included 30 representatives of the horticultural societies of the 11 eastern seaboard states, Appalachian Apple Service, New York & New England Apple Institute, Western New York Apple Growers Association, and Virginia Apple Commission. The agreements are:

"*Policy I*—We support Mr. Ezra Taft Benson, Secretary of Agriculture, in pursuit of his objectives, to obtain in the market place full parity prices of farm products and parity incomes for farm peoples.'

"We are prepared to support affirmatively his statement, to wit: 'The most important method of promoting the long-time welfare of farm peoples and the nation is the support of adequate programs of research and education in the production, processing, marketing, and utilization of farm products and in problems of rural living.'

More Research Needed

"More specifically, we need broader research in and adequate support of the following:

"1) Marketing of apples by varieties, grades, and packages.

"2) More accurate crop and market reporting throughout the entire marketing season.

"3) An up-to-date fruit tree census on a state, regional, and national basis.

"*Policy II*—We should take definite steps to reaffirm our long-standing position of insisting on nondiscriminatory access to foreign markets for our products. We call upon the Administration and Congress to so equip the Office of Foreign Agricultural Relations with adequate appropriations and personnel so that it can adequately discharge its functions in upholding our agricultural position in foreign trade.

"*Policy III*—Since, under existing laws, fruit growers are prosecuted by the Federal Trade Commission seeking to prohibit discussion of the supply and demand situation with processors and others, we feel it is time to seek clarifying legislation to remove such interference with the normal and necessary marketing processes.

"*Policy IV*"—The Department of Labor and the Department of Agriculture should make certain that an

adequate supply of off-shore and foreign labor is provided for fruit growers so that high-cost fruit crops will not be wasted through lack of harvest help.

"May we point out to the Departments involved that this seasonable labor earns wages comparable to, and in many cases greater than, that of industrial workers. The average wage of off-shore and foreign workers can be more than doubled by employment on farms in this country.

The Federal Role

"*Policy V*—It is the desire of the apple industry of New England, New York, New Jersey, and the Appalachian states to market their crops on the open market without the benefit or hindrance of government participation of any sort. Every attempt should be made to educate the growers of our respective sections to the end of using all existing market outlets without requesting governmental aid. However, it is our realization that governmental issues and affairs are to be a part of our everyday lives and industry as far as we can see into the future.

"Therefore, the above-mentioned grower group should make every effort to insure that apples are placed in the same bargaining position as other similar commodities with regard to their consideration by any governmental agency whether for purchase for School Lunch or other reason. And, aggressive and positive action should be taken to the end that the apple industry shall receive its rightful share of the so-called Section VI monies.

"Should it become desirable for representatives of any of the eastern apple grower organizations to go to Washington for the purpose of influencing legislation or purchasing policy it is agreed that a preliminary meeting, or meeting of the whole group, be held to provide the opportunity to explain the individual situations and to solidify the opinion of the group as a whole in advance of the Washington meeting.

"It is the interpretation of the group present that the above pertains only to the sale or disposition of apples and apple products within the continental United States.

"*Policy VI*—Since several states are setting up contradictory regulations on weights and measures for fruits and vegetables, it was suggested that a committee of Carroll Miller, A. F. Vierheller, and Truman Nold be delegated to confer with the proper department in the Department of Agriculture to draw up, with the assistance of other regions, uniform weights and measures regulations for perishable fruits and vegetables."

Growth Regulators on APRICOTS

Multiple action of 2,4,5-T on apricots results in earlier maturity and marked increase in size of fruit and reduction in fruit drop

By JULIAN C. CRANE

University of California

AT THE annual meeting of the American Association for the Advancement of Science in 1951, the retiring president speaking on "Man's Synthetic Future" predicted that, through the use of plant growth regulating substances, pears, apples, or oranges may be stimulated to grow to the size of grapefruit. Fantastic? No!

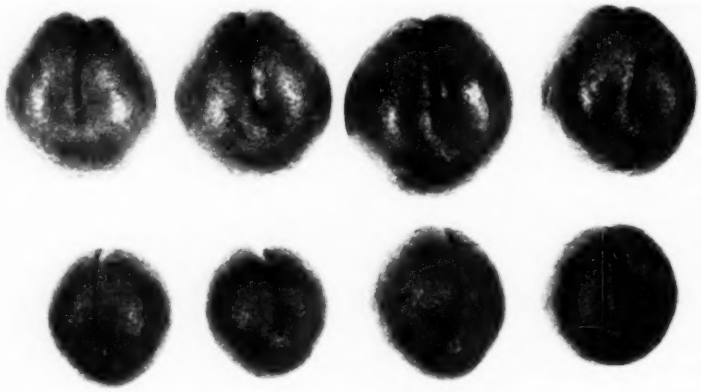
During the summer of that year a spray application of 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) brought about a 35 per cent increase in the volume of Royal apricots that matured 10 days earlier than unsprayed fruits.

Various concentrations of the ammonium salt of 2,4,5-T in water were sprayed on Royal apricot trees at different times during the season, beginning at the time when the pits in the fruits were starting to harden. In general, the higher the concentration of 2,4,5-T and the earlier in the season it was applied with reference to the initiation of pit hardening, the greater was the increase in ultimate size of the fruit and the earlier its date of maturity.

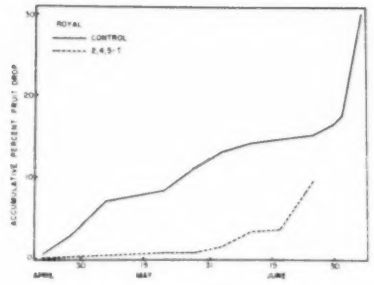
Depending upon the time and the concentration at which the spray was applied, apricots matured a maximum of 18 days early and were a maximum of 35 per cent larger in volume than unsprayed fruits. The increase in fruit size was the result of a stimulation in growth of the flesh.

Accompanying the beneficial effects of 2,4,5-T application were certain undesirable features. For example, in certain instances the fruits were stimulated to grow so much and so rapidly that they split open; the split areas later became infected with brown rot and other fruit spoilage diseases.

Of less consequence was the injury to the tips of the branches. Generally speaking, the results of the 1951 tests indicated that a concentration of 100 parts of 2,4,5-T in a million parts of water applied at the initiation



Above—Derby apricots in top row are from trees sprayed with 100 ppm 2,4,5-T; in bottom row from unsprayed trees.



Right—Graph shows average accumulative percentage of fruit that dropped from unsprayed Royal apricot trees and from trees sprayed on April 14, 1952, with 50 ppm of 2,4,5-T. Sprayed fruit matured 10 days earlier than unsprayed.

of pit hardening combined more of the beneficial and less of the deleterious effects than applications made otherwise.

Investigations during the 1952 season were expanded to include semi-commercial scale application to three varieties and under different environmental conditions.

Fruit volume was increased from a minimum of 25 per cent in the Stewart variety to a maximum of 37 per cent in the Royal variety, the Derby being in between. Measurements of the flesh showed that this portion of the fruit increased in thickness, as in the year previous, from a minimum of nine per cent in the Stewart variety to a maximum of 20 per cent in the Royal.

On a fresh weight basis, the average increase in yield of fruit was 17, 22, and 28 per cent for the Stewart, Derby, and Royal varieties, respectively. Fruit maturity was hastened three days in the Stewart and Derby varieties and as much as 10 days in the case of the Royal.

Objectionable features as a result of spray application were manifest as tiny cracks in the skin at the blossom end of the fruit or as cracks along the suture that were from a few millimeters to over an inch in length. This condition varied depending upon the variety, location of the experiments, and the time of spray application.

In one orchard only an occasional branch with tip burn could be found while in another orchard it was exceptional to find a branch that was not injured in this manner. Tip burning of the shoots is not considered particularly objectionable, however.

A very striking effect of 2,4,5-T application in one particular orchard was the pronounced development of red color in the fruit as it matured. An identical concentration of the spray applied at approximately the same time in another orchard having somewhat different environmental conditions failed to induce red color development.

Trees sprayed with 50 ppm of 2,4,5-T were found at harvesttime to have dropped only 10 per cent of their fruits while comparable unsprayed trees dropped 30 per cent of their crop. The spray was found to be equally effective on all varieties tested.

Since 2,4,5-T application brought about a marked reduction in fruit drop during a period of 50 to 60 days (see graph), time of application, on the other hand, would appear to depend more upon the type of fruit drop expected with a particular variety in a given location. THE END

A NEW HORIZON

(*Continued from page* 11)

the same season it is applied, but the visible effects do not appear until the next season after growth is resumed.

A second point is that regulators act upon the normal physiological processes in the plant, just as a human being directs a motor car through the various control mechanisms of the steering wheel, brake, and accelerator.

If the plant regulator is in oversupply, in undersupply, or wrongly distributed, the typical growth of the plant is altered. Thus, the natural hormone, indoleacetic acid, is inactivated by the ultra-violet light of high altitudes so that elongation is suppressed and plants are typically dwarfish. On the other hand, 2,4-D is a highly potent regulator which in high concentrations induces increased growth and respiration (among other things) which may result in degeneration and death.

What Shall They Be Called?

And now just a word about terminology. When the chemical is produced naturally in the plant it is called a "hormone" much as in animal terminology. Thus indoleacetic acid, which occurs naturally in plants, is properly called a "hormone."

But naphthaleneacetic acid, indolebutyric acid, and 2,4-D, which are used in blossom thinning, rooting of cuttings, and prevention of fruit drop, do not occur naturally and so are not properly called hormones. Yet to the layman they seem for all practical purposes the same and so he frequently calls them "hormones." Perhaps this will be the final outcome, since a language is made by those who use it.

But in the interests of both accuracy and simplicity it would seem just as well to group all of these compounds together—hormones and hormone-like—and call them "growth regulators" or simply "regulators" and be done with the argument. This is the trend and is a simple solution. So, to us, "growth regulator" or simply "regulator," it is. THE END

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Growth Regulators to DELAY BLOSSOMING

Pennsylvania experiments show that maleic hydrazide retards blossoming of brambles and that regulators in combination may have similar effect on tree fruits

By DAVID G. WHITE
Pennsylvania State College

FOR MANY years horticulturists have wished for a method which would retard the opening of flowers on fruit trees in order to avoid the damage of late cold weather. About 15 years ago naphthaleneacetic acid sprayed on peach trees apparently delayed their blossoming. Unfortunately additional studies with this and other growth regulators failed to result in a practical delay.

In 1949 a material called maleic hydrazide revitalized the search for a treatment to delay blossoming. This material, although not technically a hormone, is capable of inhibiting the vegetative development of many plants. It was hoped that maleic hydrazide also would inhibit the opening of blossoms.

Such was not the case with the blossoms of tree fruits, but this material repeatedly has delayed the blossoming of brambles, such as raspberries. Usually brambles produce shoots a few inches long before flowers appear. The flowers develop on these new shoots. A spray of 50 to 500 parts per million (ppm) of maleic hydrazide applied when the first leaves have expanded to about the size of your fingernail results in an inhibition of vegetative growth and consequently retards blossoming of the plants from two or three days to as long as 10 to 15 days.

Maturation of the fruit is retarded somewhat less. Tree fruits ordinarily differ from brambles in that there is no vegetative growth from the same bud which precedes flowering and maleic hydrazide has not delayed the opening of tree fruit blossoms.

Among other trials with maleic hydrazide, young Northern Spy apple trees were sprayed in anticipation that the trees might be induced to begin bearing at an earlier age than the customary 15 years or more usually required before this variety bears fruit. Although at the time of this writing the treated trees have not yet flowered, we are encouraged that they soon may begin to bear fruit because of the spur-like growth caused by maleic hydrazide.

A companion observation made with the same trees also is of possible practical value. Maleic hydrazide sprays of 1,000 to 2,000 ppm definitely have retarded their height. It is in the realm of possibility, therefore, that such a treatment may be employed some day to maintain orchard trees of semi-dwarf size.

Experiments designed to delay blossoming have been continued in a somewhat different fashion. The results from a non-related study on the promotion of red color development in apples furnished an impetus for a new approach in trials to delay blossoming. The red color of apples was observed to be augmented more often by sprays containing two or more regulators in combination than by sprays which contained each of the same regulators alone. The effects of treatments which consist of a combination of regulators cannot be predicted easily.

Realizing this, 351 different treatments made up of 26 regulators used alone and in all possible paired combinations were applied to leaf scars which subtended fruit buds of peaches in the fall of 1951. In the spring of 1952, about a dozen of these treatments delayed the opening of the peach flowers without causing apparent injury. Of these promising treatments only one consisted of a single regulator and all others were of two regulators in combination. The delay in blossoming ranged from three or four days to as much as eight days.

These results are only from screening tests and much additional investigations must be done before fruit growers would wish to try such treatments. Last fall the more promising treatments of 1951 were repeated and an additional 231 treatments which consisted of regulators combined in threes, fours, and fives were applied. The results this spring should be most interesting. THE END

WEED CONTROL

(*Continued from page* 15)

Apply 40 to 50 gallons per acre in a strip 18 to 24 inches wide beneath the trellis. Use low pressure (50 to 70 pounds per square inch) and fan-type nozzles. Keep the spray off the foliage and do not spray young vines which do not have a protective coating of loose bark.

Brambles—Brambles are somewhat tolerant to 2,4-D and basal-directed sprays of this herbicide or contact herbicides such as DNBP can be used. The first application should be very early in the spring before weeds and new bramble shoots emerge. The second application should be delayed until the new bramble shoots are tall enough so that spraying the growing tips can be avoided.

One-half to three-fourths pound of 2,4-D in the acid form can be used for early spring application, while later application should not exceed one-half pound. The material should not be used during the blooming stage as it interferes with fruit setting and development.

Selective dinitros (ammonium or amine salts of DNBP) can be used at two to four pounds per acre. Higher concentrations should be used in the early spring treatment and weaker concentrations while the new canes are tender. A minimum amount of spray should contact the cane bases. To be effective selective dinitros must be applied while grass and broad-leaved weeds are small.

SES has shown promise as a herbicide in raspberries. It is used any time during the season at the rate of three to six pounds per acre. To be effective SES must be applied ahead of weed emergence.

Strawberries—For use in strawberries, 2,4-D and SES are the most promising. Where the soil is little disturbed during planting, 2,4-D (amine salt) has shown promise as a preplanting treatment at the rate of two to three pounds acid equivalent per acre. As selective foliage sprays, 2,4-D may be used at the rate of approximately one pound during the period three to four weeks after setting until late August when fruit bud differentiation begins.

Runner production may be reduced by 2,4-D application. The degree of reduction depends upon the concentration, number of applications, environmental conditions, and physiological stage of plant when treated. Treatment at the time of runner initiation usually causes a marked inhibition of the runners. It causes

fruit deformities when applied during fruit bud differentiation and also serious damage if applied during the blooming period.

This herbicide has an important place in weed control the second summer and can be used at rates of one and one-half to two pounds per acre. A procedure that has given very good results is: 1) mow the field immediately after harvest, 2) cultivate the middles, 3) spray the entire field with 2,4-D, and 4) repeat application of 2,4-D after about four weeks.

SES is less injurious to strawberry plants than 2,4-D. This material may be used immediately after setting of plants, at the rate of three to six pounds per acre. Good weed control is usually obtained for three weeks or longer.

Applications may be made during spring, summer, and fall as needed. Runner production is reduced only slightly. For best results cultivate and remove all weeds before spraying. The chemical acts primarily as a seed toxicant and is effective against weeds only in the germinating or very early seedling stage.

SES is the preferred chemical for a new planting during spring and early summer. For late fall applications in the new field and for sprays after renovation the second summer, 2,4-D is the better material.

Herbicides may be applied to the whole field or applied only in a band in the row. The rates of application are based on the area sprayed and the actual amount of the chemical applied will be one-half or less of the per acre rate in the case of band applications. THE END

"SAFETY SAVES"

A NEW training and safety film for industrial truck operators has been produced by the Clark Equipment Company. The new 30-minute sound movie, entitled "Safety Saves," was filmed at on-the-job locations.

Along with examples of how *not* to handle a fork truck, the movie shows the safe, correct method. Besides fork lift truck operation, "Safety Saves" gives instructions for operators of towing tractors and hand trucks.

"Safety Saves" is available on a loan basis from Clark Equipment Company, Industrial Truck Div., Battle Creek, Mich.

Growth Regulators on CITRUS

Both 2,4-D and 2,4,5-T reduce mature fruit drop and increase fruit size and keeping quality of oranges, lemons, and grapefruit

By LOUIS C. ERICKSON
University of California

OF THE numerous synthetic plant growth regulators available, only 2,4-D (2,4-dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) are used to any extent on citrus. Indoleacetic, indolebutyric, and naphthaleneacetic acids may be used to advantage in rooting cuttings of some species of citrus but they do not have field applications. Beta naphthoxyacetic acid is effective for reducing mature fruit drop of citrus but the duration of the effect is too short for best results, and the cost imposes a serious limitation.

Both 2,4-D and 2,4,5-T may be used more or less interchangeably on citrus. However, the latter is about twice as active as the former and therefore should be used at about one-half the concentration.

Reduction of mature fruit drop.—An application of from 8 to 25 parts per million (ppm) of 2,4-D on mature or nearly mature citrus fruits will usually reduce the drop of sound fruits 50 per cent or more for a period of up to four or five months. The time of applying the spray varies with the variety and location. However, the best results are obtained when the spray is applied in advance of the fruit dropping period.

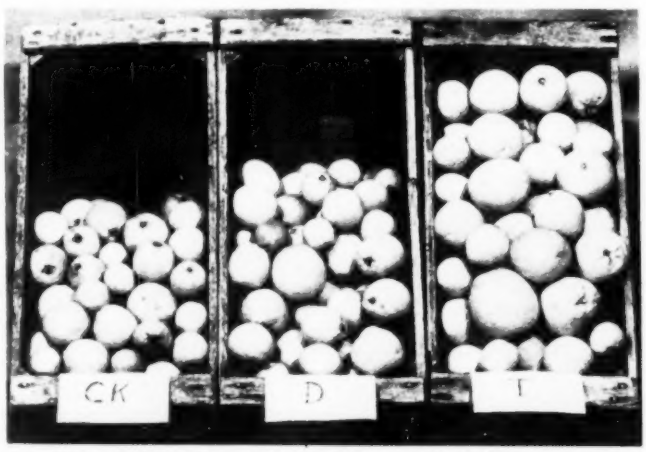
In the case of Washington Navel oranges, it is advantageous to add 4 ppm of an ester form of 2,4-D to the summer oil spray and thereby eliminate the need for a separate winter spray to hold mature fruit.

Reduction of fruit-stem dieback.—This undesirable feature of having the fruit-stem die as the fruit matures is not universal but in instances where it has been prevalent the use of 2,4-D sometime prior to the onset of the irregularity has reduced it by 80 per cent or more. When 2,4-D has been used for some other purpose, such as reducing mature fruit drop or increasing fruit size, it also reduces fruit-stem dieback.

Increasing fruit size.—In order to increase the size of citrus fruits with 2,4-D it is necessary to spray the trees when the fruits are very small. The spray can be applied at full bloom but it is more desirable to delay the spraying until from four to 10 weeks after bloom. For oranges and grapefruit the concentration of 2,4-D required to increase the fruit one packing house size varies from 12 ppm at four weeks to 24 ppm at 10 weeks after bloom. Stronger sprays result in excessive coarseness of the fruit.

Lemons may also be increased in size, particularly with 2,4,5-T, but this is achieved at the expense of noticeable thinning.

Increasing the keeping quality of the fruit.—Spraying citrus fruit with



Growth regulators increase size of oranges. Each box contains 100 oranges. Those in box marked Ck were not treated; those in D were sprayed with 16 ppm 2,4-D; those in T were sprayed with 16 ppm 2,4,5-T.

2,4-D tends to keep the button or stem-end of the fruit green and healthy. Lemons in particular are stored for long periods before they are placed on the market. During this curing process they are subject to deterioration which may involve decay or merely a blackening of the button.

Rinsing the fruit with 2,4-D as a final step in the washing process has resulted in a prolonged storage life of the fruit, and although 2,4-D is not a fungicide nor a fungistat it has kept the tissues in a condition less susceptible to certain fungi, particularly the stem penetrating ones such as black rot (*Alternaria*).

So far it has not been possible to increase fruit set nor reduce June (summer) drop of citrus fruits with plant growth regulators.

While the foregoing account of the use of plant growth regulators applies in California, it should be remembered that under other climatic conditions the results may not be entirely the same. As an example, it has been reported from Florida that Pineapple and Temple oranges respond to a preharvest spray of 2,4-D, but that Valencia oranges do not. THE END

HANDY ANDY

Andrew and George Landry, Hillsboro County, New Hampshire, use spotlights to sell their fruit. They arrange a display of packed fruit in tiers along the wall of their packing house and adjust a series of inexpensive spotlights to attract attention. Almost any electrical store can supply the spotlights used by the Landrys. The one in the photo is a heavy outside type, 150 watts, made by the Swiveler Co., 30 Irving Place, New York 3, N.Y. The holder, made by the same company, can be adjusted to any angle.—*Charles L. Stratton*

Read the advertisements and remember advertisers will be glad to send you catalogs, specifications, and prices. Be sure to say you saw it in AMERICAN FRUIT GROWER.

Growth Regulators on CHERRIES

NAA sprays one-tenth the strength of preharvest apple sprays are proving effective in controlling cracking of sweet cherries

By R. M. BULLOCK
Utah State Agricultural College

FRUIT cracking is a serious problem in the production of sweet cherries. In the irrigated valleys of eastern Washington, where the average annual production of cherries is approximately 25,000 tons, the losses from cracking have exceeded 50 per cent of the crop in the most susceptible varieties. In individual orchards losses of 85 per cent or more have been experienced.

The type of cracking common to this area is due to an absorption of water through the skin of the fruit. Cracking is directly affected by the osmotic concentration of the fruit juice, tension of the skin of the fruit, temperature of the water, and fruit skin permeability. These, in turn, are affected by soil moisture below the wilting point, excessive transpiration rate, inherent varietal characteristics, and local climatic conditions.

A number of treatments have been proposed for controlling the cracking of cherries. Sprays of Bordeaux mixture and other calcium or lime sprays have been shown to reduce cherry cracking but they leave an objectionable fruit residue at harvesttime. This residue can be removed effectively with 0.5 to 1 per cent acetic acid sprays or washes.

Sprays containing aluminum compounds have been found more effective in preventing cracking of cherries than sprays containing calcium; but they, too, leave an objectionable fruit residue at harvesttime that is difficult to remove and under certain conditions, not too well defined, they may cause fruit spotting.

During the past four years considerable research has been accomplished in the use of growth regulators to reduce cherry cracking in an effort to find a material that would not leave an objectionable residue at harvesttime or injure the fruit in any way.

The material that has been most promising so far is the sodium salt of naphthaleneacetic acid. This is the material that is now commonly used to prevent preharvest drop of apples. Investigations so far indicate that the dry powder products are more satisfactory than oil formulations. If liquid or oil formulations are used, only the highly concentrated ones should be used so as to have as little oil in the final mixture as possible.

The concentration of the regulator should be one part per million in the spray mixture. This concentration is just one-tenth as strong as is commonly used to prevent the preharvest drop of apples. It is extremely important to have this concentration measured exactly. Less than 1 ppm concentration will reduce the effectiveness of this spray and higher concentrations may increase cracking.

The timing of this spray is also quite important. The season between full bloom and harvest for Bing cherries is normally from 60 to 65 days. The spray should be applied midway between bloom and harvest, which would be 30 to 35 days following full bloom or 30 to 35 days before harvest. Spraying later than this date tends

to reduce the effectiveness of the spray until later than 20 days before harvest may even increase cracking over the normal percentage.

All of the experimental work has been carried on with dilute hand sprayer application. Observations of applications by dilute speed sprayers have been satisfactory. However, results with concentrate sprayers and by air-borne applicators have been erratic. For the present time, these sprays can be recommended only for dilute sprayer application.

Sprays of the sodium salt of naphthaleneacetic acid at 1 ppm applied 30 to 35 days before harvest have consistently reduced the percentage of fruit cracking in cherries 50 to 60 per cent. In some cases the reduction in cracking has been even greater.

The size of crop on the trees apparently plays an important role in the effectiveness of the spray. In three test orchards in 1950 where there was a marked difference in the size of crop, the response to treatment varied with the size of the crop. Where the crop was less than 10 per cent of a full crop, the cracking was reduced only 4 per cent; with a 50 per cent crop, it was reduced 33 per cent; and with a 75 per cent crop, it was reduced 50 per cent. This is in accord with long-standing observations that the cracking is greatly increased where there is a light load of fruit on the tree.

During the 1951 season heavy rains occurred prior to and during the harvesting period for cherries. Four commercial blocks of fruit were sprayed with the sodium salt of naphthaleneacetic acid at 1 ppm 30 to 35 days before harvest to compare with unsprayed blocks in the same orchards. Each of the sprayed and unsprayed blocks was handled through the warehouse as separate lots of fruit and the cullage from cracking was recorded for each block.

COMPARISON OF BING CHERRY CRACKING

Unsprayed and sprayed fruit (1 ppm NNA 30 to 35 days before harvest) following heavy 1951 rains

Block No.	Cracked Fruit Unsprayed	Cracked Fruit Sprayed
	%	%
1	22	10
2	38	8
3	42	16
4	28	12
Av.	32	11

The accompanying table shows that the reduction in cracking in the sprayed blocks varied from 55 to 80 per cent as compared with unsprayed blocks in the same orchards.

This spray does not leave a residue on the surface of the fruit and does not change the chemical composition of the fruit. THE END

NEW FOR YOU

Don't Guess

The first step in proper control of orchard insects is to correctly identify the pest. Every fruit grower should have a magnifying glass for insect identification, and the new Bausch and Lomb Hastings triplet magnifier has been designed for your needs. It costs only $12, and you can order direct from Jack Brandt, Bausch & Lomb Optical Co., 510-16 Bausch St., Rochester 2, N. Y.

Weeds

The new Crag Herbicide 1 prevents weeds by killing the seeds as they start to sprout. This new chemical works through the soil and not on plant leaves. If you want further details write Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.

Tractor Lift Attachment

The Holt 10-foot fork lift truck can be easily attached to all Ford, Ford-Fergu-

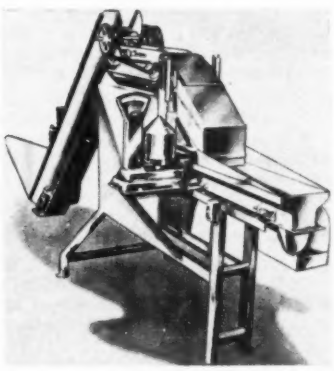
- **MAGNIFYING GLASS**
- **WEIGH-PACKER**

son, and Ferguson tractors; and it has a capacity of 2,000 pounds. Write Independent Distributors, 27 N. E. Broadway, Portland 12, Ore.

I Have One

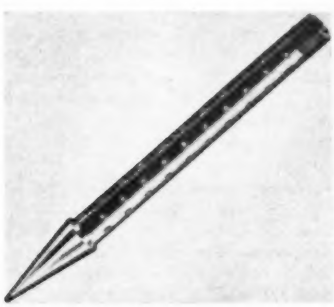
I have found that my Man-Power-Pull winch has paid for itself many times over, pulling out average two-foot diameter trees in a few minutes. It handles 45 tons and costs very little. Frank L. Williams is the man to write at Man-Power-Pull Winches, Gloucester, Va. He will be glad to send you information at no cost.

Save 60 Per Cent



Fruit growers are turning to pre-packaging for greater profits. The new Weigh-Packer saves 60 per cent on labor costs by eliminating check weighing. Ten to 21 bags can be filled per minute, properly weighed and ready for delivery. We urge you to write James F. Kelly, Aeroglide Corp., Raleigh, N. C., for particulars on this useful machine.

Drill Your Own Well



To simplify driving your well, Capital Mfg. & Supply Co. has developed a well point called "Protecto-Screen." The well point is made of forged steel and has 30 per cent more inlet holes than many older types. Capital Mfg. & Supply Co., Columbus, Ohio, will be glad to send you details.

PERIODICAL CICADA

(*Continued from page 18*)

The adult periodical cicada is a little more than one and a half inches long. Its body is mostly black, its legs and wing veins orange, and its eyes red. It is different in color and smaller than the dog-day cicada which appears every year during August and early September in the eastern half of the country.

The male periodical cicada has a peculiar structure in its body with which it produces several kinds of sounds. The noise may be almost deafening when the cicadas are numerous.

The females have a strong egg-laying apparatus which they use to cut slits in the undersides of twigs or small branches, into which they lay eggs. This often causes the twigs to die and break. Their feeding, which is done by sucking sap from the twigs or roots of the trees, is of little importance.

The eggs start to hatch in about six weeks. The tiny, newly hatched cicadas drop to the ground and work their way into it and for many years feed on the roots of trees and plants. Through much of its geographic range this cicada requires 17 years for its life cycle; in southern localities its development is speeded up and it matures in 13 years.

Periodical cicadas appear every year somewhere in the eastern half of the United States. Because of its unusual life story, the areas in which the outbreaks can be expected have been closely charted. In some instances the record can be traced to early colonial times. One of the largest broods is the one due in May, 1953.

A well-illustrated folder entitled, "The Periodical Cicada in Pennsylvania Orchards," is available from the Pennsylvania Agricultural Experiment Station, State College, Pa. Ask for Progress Report No. 88.

Control: For the first time in history an insecticide can be suggested for controlling the periodical cicada. TEPP, tetraethyl pyrophosphate, has considerable value for this purpose. TEPP should be used at a strength of about one-half pint of a 20 per cent mixture, or one-quarter pint of a 40 per cent. Spraying should start a few days after the cicadas first appear, and is most effective early in the day while the insects are fairly sluggish. TEPP acts only on direct contact with the insect.

Since the material has little value against cicadas that later migrate to the trees, repeated applications are necessary. The exact number of applications depends on the extent and rapidity of reinfestation.

CAUTION: TEPP is extremely dangerous to handle. Serious effects, or even death, may result if the material is swallowed, inhaled, or absorbed through the skin. Read and follow the precautions on the label.

Protection against the insect may be given to newly planted or young orchard trees by the use of netting, heavy cheesecloth, or tobacco seedbed or shade cloth. The trees should be covered as soon as the cicadas first appear, and the covering should not be removed until they have mostly gone.

The worst of the damage also may be avoided by not setting out new orchards a year or two preceding severe outbreaks of the cicada. Information on the years in which severe outbreaks may be expected is available from your state agricultural experiment station or extension service.—*B. A. Porter, USDA*

Growth Regulators on STRAWBERRIES

Two-year tests on the Marshall variety point the way to experimental use by growers of NXY to obtain increased yields of larger berries

By QUENTIN B. ZIELINSKI

Oregon Agricultural Experiment Station

RECENT field experiments conducted at Oregon State College, Corvallis, indicate that soon another of the growing family of growth regulating chemicals may become important to strawberry growers by increasing size and yield of the crop.

Investigations with the growth regulator beta naphthoxyacetic acid (NXY) have been conducted over a two-year period with Marshall strawberries grown under supplemental irrigation in the Willamette Valley. Results showed increases in yields varying between 10 and 20 per cent. The experiments have been confined to a limited set of environmental, soil, and moisture conditions.

Limited data from these tests indicate that the spray may not be effective in cases where soil moisture is deficient at harvesttime, also that for best results a regular or "normal" irrigation practice is sufficient.

Of the various concentrations tested, that of 50 parts per million (ppm) of the growth regulator gave the best results. This is equivalent to 20 grams of the chemical to 100 gallons or one-fourth pound to 570 gallons.

To improve the spreading quality of the spray, it was found advisable to add a spreader or detergent. The material sold under the trade name of "tween-20" has given good results. This liquid preparation should be added at the rate of one pint to 500 gallons of spray. Several of the available commercial preparations of the growth regulating chemical are compounded with "tween-20" added to the concentrated solution.

The spray mixture remains in suspension fairly well so only a moderate amount of agitation, as obtained in most compressed air sprayers, is desirable.

Time of Application.—Extensive tests in 1952 indicate that two spray applications are necessary. The first should be made approximately 14 days after full bloom or when the fruits from the first blossoms are about one-third full grown, and the second, also at the 50 ppm concentration, four or five days later.

The cost of the material amounts to only about $1 per acre.

Methods of Application.—Either a compressed air hand sprayer or a power sprayer can be used, provided it operates in the low pressure range between 50 and 100 pounds. It is important that the operator thoroughly wet the foliage, fruiting stems, and developing berries. This requires a minimum of about 100 gallons of spray per acre of strawberry plants.

Precautions.—While the concentrations of 50 ppm caused no visible injury to strawberry plants and no malformation of fruit over a two-year period, there is the possibility that injury might occur under a different set of conditions; and there is the possibility of cumulative effects.

In addition there is always the possibility that the chemical might cause injury to plants other than strawberries. Precautions should be taken, therefore, to keep the spray away from other plants.

Fruits harvested from experimental plots appeared to be typical in color, flavor, and texture for the variety. No evidence of undesirable edible qualities was apparent.

Recommendations.—The Oregon Experiment Station cannot at this time make unqualified recommendations governing the commercial use of beta naphthoxyacetic acid and the suggestion is made that the material be tried out on an experimental basis, confining the applications to a few rows of plants. Such tests should indicate to the grower the results that may be expected under his particular set of growing conditions.

Sources of Supply.—The chemical is available either as the pure form of beta naphthoxyacetic acid or as the sodium salt of this chemical. While the sodium salt form is soluble in water, it requires a few minutes for the material to go into solution. Therefore, for most practical purposes it is probably advisable for growers to buy the pure form which comes prepared in an alcoholic base and can be readily mixed with water.

At the present time, the chemical can be obtained in convenient amounts from Miller Products Company, Caruthers St., S.W., Portland, Ore.; Meeker-Hughes Company, 520 Trade St., Salem, Ore.; and from Science Products Company, 1230 E. 63rd St., Chicago 37, Ill. THE END

HOW NAA THINS APPLES

(*Continued from page* 14)

in the seed is formed and the embryo has started its period of rapid development, the seed is resistant to the action of NAA, and chemical thinning is no longer possible. This stage is reached between two and four weeks after petalfall, depending on the variety of apple and the season.

Although it is often possible to thin apples with naphthaleneacetic acid as late as four weeks after petalfall, our experience in England has shown that it is desirable in practice to apply the spray within the first week after petalfall. Later applications, although they thin the crop, often seriously retard fruit growth and thus offset any increase in fruit size which might otherwise have been gained by thinning.

Whether or not any individual fruitlet drops as a result of a post-blossom application of NAA depends on a number of factors, the chief of which appear to be:

1) The stage of development of the seeds. As the seeds become more resistant to NAA with increasing age, this may be expected to favor the retention of the most advanced fruitlets, particularly the "king" or terminal fruitlet in each cluster.

2) Seed number. If a particular fruitlet contains a full complement of 10 seeds, the destruction of five by NAA would still leave sufficient to insure the retention of the fruit on the spur; but the destruction of five out of a total complement of six would almost certainly result in the shedding of the fruitlet. This probably explains why NAA tends to remove the weaker fruitlets, which, on the average, have fewer seeds than the stronger ones.

3) The amount of NAA received and its distribution within the fruitlet. The chief path of entry of the regulator into the fruitlet appears to be through the spur leaves. Some leaves will inevitably retain more spray than others, and this may lead to variation in the amount of NAA which reaches the different fruitlets and different seeds within a fruitlet.

Although these experiments, to some extent, resolve the paradox of the fruit thinning action of naphthaleneacetic acid, and thereby make possible a more rational approach to the problem of chemical fruit thinning, it must be emphasized that there are still many gaps in our knowledge which can only be filled by further research. THE END

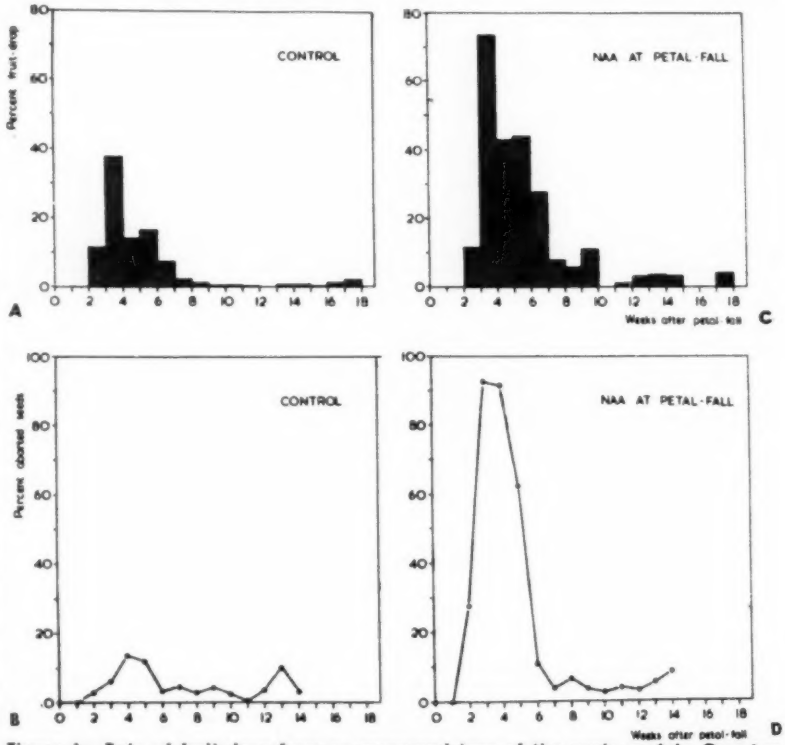


Figure A—Rate of fruit drop from an unsprayed tree of the apple variety Crawley Beauty during successive weeks after petalfall. B—Percentage of aborted seeds found in samples of fruit picked at weekly intervals from petalfall onwards. C—Fruit drop record of a similar tree sprayed at petalfall with NAA 40 ppm. Note that thinning does not start until four weeks after application of the spray. D—Percentage of aborted seeds found in weekly samples of fruit from the sprayed tree.

HOW NAA MADE A PROFIT FOR TREESDALE FARMS

Raymond Reiter, assistant manager of these extensive Keystone state orchards, tells how NAA corrected alternate bearing and gives pointers on application procedure

HERE at Treesdale Farms in Mars, Pa., we applied 45,000 gallons of naphthaleneacetic acid (NAA) thinning spray in 1952 as compared to 75,000 gallons in 1951. The material we used was Eastern States hormone spray.

The concentrations which we have found most satisfactory and the varieties on which the spray was used are: four ounces per 100 gallons on Delicious, Northern Spy, Rome Beauty, and Red Rome; six ounces per 100 gallons on Jonathan, Winter Banana, and Stayman (eight ounces per 100 gallons used on the latter if trees are very heavy); eight ounces per 100 gallons on Wealthy, Summer Rambo, McIntosh, Cortland, Grimes, Golden Delicious, Baldwin, and Lowry.

Here are some points we found well worth considering when using naphthaleneacetic acid-type materials:

1) The chief advantages of chemical thinning are lower thinning cost, larger fruits, and higher yields because of heavier annual production.

2) It appears that the extent of thinning is related in part to the vigor of the spur. The lower the vigor of a spur the greater are its chances of being thinned. Hence, low vigor trees should not be sprayed or they should be treated with reduced concentrations.

3) Foliage may appear "wilted" for several days and then recover. This indicates that fruit thinning will take place.

4) It seems advisable to apply these thinning materials alone rather than in combination with insecticides and fungicides. Tests indicate that sulfur may reduce the thinning effectiveness of NAA materials. No wetting agent should be added to NAA materials since they may greatly increase foliage injury and the degree of thinning beyond that desired.

As another safeguard, the thinning spray should be applied at a time when no pesticide sprays will be needed for a week or so. Foliage in the temporary "wilted" condition following an NAA spray may be more susceptible to injury from pesticides than under normal conditions.

5) Do not repeat the application in order to do additional thinning. You may take off all the fruit.

6) All thinning, whether done by hand or by chemicals, tends to hasten the maturity of the remaining fruit. Therefore, fruits on chemically thinned trees may be ready to pick several days in advance of fruit of smaller size on unthinned trees.

7) The thinning effect of NAA sprays does not appear immediately. The fruits that are to drop may not commence to fall off for a week or 10 days following treatment. However, many of the fruits which are going to drop can be detected because they fall behind the other fruits in size.

8) The longer thinning is delayed the less effect one will get on fruit size. Therefore, it is desirable to make applications on early varieties first at 10 days after petalfall and try to complete all varieties by 14 days after petalfall, using the first day of petalfall spray as a base to count from.

9) Do not soak the trees. Use the same gallonage per tree as on the petalfall spray.

10) No definite explanation of the physiological effect of hormone-like sprays in reducing the set of apples has yet been offered. It is known, however, that the spray is selective in its action and tends to eliminate the type of fruit that is likely to develop into low-grade apples at harvest. Thus, fruits that are borne on weak fruiting wood and fruits that have a low seed content due to imperfect fertilization are the most susceptible to the action of these sprays.

Due to the fact that we did a lot of chemical thinning in 1951, our alternate bearing varieties which should have been off in 1952 were back with a full crop, and we had to thin them again. The check rows and blocks had light crops. This is how 75,000 gallons of chemical thinning in 1951 helped us to make money in 1952. In 1951 we had 128,040 packed bushels, plus 12,000 not harvested, and in 1952 we had 125,466 packed bushels. In 1949 and 1950 when we did not chemical thin, we had 150,000 and 91,336 packed bushels, respectively.

We are convinced that chemical thinning has helped us greatly and we plan to make it a regular part of our spray program. However, it can be dynamite in the hands of someone who is not careful, and we do not recommend it unless one is extremely careful. THE END

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WANTED TO BUY

WANTED: GASOLINE ENGINE—flywheel type—J. H. AYER, Plainville, Ohio.

An index of articles which appeared in AMERICAN FRUIT GROWER in 1952 is available. Simply send a post card request for your copy to AMERICAN FRUIT GROWER, Willoughby, Ohio. A binder for your 1952 copies will be sent upon receipt of your request and a dollar bill.

RECOVERY OF CULTURE

by Henry Bailey Stevens

Is there some lofty purpose and unseen force in the pursuit of fruit growing beyond providing the essentials of 20th century living? In his book RECOVERY OF CULTURE Henry Bailey Stevens, a fruit grower and director of the University of New Hampshire Extension Service, arrives at some startling conclusions. When man left his fruit culture and became a flesh-eating and war-making animal, trouble began. Cain the gardener slew Abel the grazier. Did peaceful man in life's journey make a wrong turn which today has manifested itself in internal strife, erosion, neuroticism, urbanization, etc.? Here is a book which will give you a new outlook, stimulate your thinking and answer your deepest questions.

Sent postpaid on receipt of $3.00

AMERICAN FRUIT GROWER

Willoughby, Ohio

The Orchard Home

SPRINGTIME means berrytime. There isn't a person alive who doesn't like fresh, warm strawberry shortcake topped with either whipped or plain cream. And, of course, we all like just "berries 'n' cream."

Naturally, you will want to preserve some of your berries and cherries. Who can resist the tantilizing aroma of fresh strawberry jam, and won't those fruit shelves of yours look wonderful neatly lined with strawberry jam, bright red cherry jelly, and red and black raspberry jams?

This month we are featuring berry and cherry recipes to tempt you. Pictured at the right is a grapefruit and strawberry cobbler. Instead of sugar for sweetening, this novel dessert calls for honey, and the grapefruit gives it that added zip.

Why not try this recipe together with the other berry and cherry recipes given below?

GRAPEFRUIT AND BERRY COBBLER

2 No. 2 cans grapefruit sections
1 pint strawberries
1¼ cups honey
1⅓ cups sifted flour
3 teaspoons baking powder
½ teaspoon salt
5 tablespoons shortening
¼ cup milk (about)

Drain grapefruit sections and combine with berries in a two-quart casserole. Blend in 1 cup of the honey. Place in hot oven (450°F.) for 15 minutes, or until fruit is heated through. Sift together flour, baking powder, and salt. Cream shortening. Add remaining honey gradually and beat until well blended. Cut into flour mixture. Stir in milk gradually, mixing just enough to make a smooth dough. Roll out on a lightly floured board to ½-inch thickness. Cut with a doughnut cutter. Place rings on top of heated fruit and bake in a hot oven (450° F.) for 20 minutes. Serve plain or with whipped cream.

STRAWBERRY JAM

Cover 3 quarts of stemmed, fresh strawberries with boiling water and let stand 5 minutes. Pour all the water off. Put strawberries into a kettle with 3 cups of granulated sugar and boil hard for 5 minutes. Add 4 more cups of sugar and boil hard for 5 minutes, stirring while adding sugar. Remove from fire and stir slowly for 5 minutes. Put in glasses. Cover with paraffin when cold.—*Mrs. B. H. Travis*

RASPBERRY DELIGHT

1 cup crushed raspberries
12 marshmallows
⅛ teaspoon salt
¼ cup sliced dates
¼ cup chopped nutmeats
1 cup whipped cream

Place marshmallows in top of double boiler and cook over hot water until marshmallows are melted. Remove and fold in all ingredients except whipped cream. Chill, and when partially frozen add whipped cream and continue freezing until firm.—*Mrs. Blanche Campbell*

CHERRY JELLY

2 pounds red tart cherries
½ cup water
2 cups sugar
½ cup apple or lemon pectin extract, or, ¾ cup orange pectin extract

Wash cherries thoroughly and remove stems. Add water to cherries, boil 10 minutes, and strain through a jelly bag. This yields about 2 cups of juice. Mix the 2 cups of juice with sugar and pectin extract. Cook until jelly stage is reached and pour into hot, sterilized glasses.—*Virginia Slattenaren*

HEAVENLY JAM

1 quart cherries, seeded and ground
1 quart red raspberries
1 quart currants
1 quart gooseberries

Combine fruit and stir well. Take equal parts of fruit and sugar. Put fruit on to boil and let juice boil up freely over fruit. Add sugar, stirring constantly so as not to scorch. Boil until thick. If you make just a quart at a time the jam will not get dark or strong.—*Mrs. Cloyce Keep*

FROZEN RASPBERRY ICE CREAM

1 pint raspberries
1 cup sugar
2 teaspoons gelatin
4 tablespoons water
1 cup milk
1 cup whipping cream

Dissolve gelatin in cold water, cook berries and sugar for a few minutes. Remove from heat and add gelatin. Put through sieve, cool, add milk, place in refrigerator tray and freeze to mushy stage. Beat well, return to tray and freeze. Remove from tray and beat once or twice during freezing. —*Mrs. Henry Thompson*

BERRY FLUFF

1 cup raspberries or strawberries
1 cup sugar
1 egg white
1 tablespoon lemon juice
Dash of salt

Put all ingredients in large mixing bowl and beat with electric or hand beater for 10 to 12 minutes until mixture is very thick and fluffy. Makes six to eight servings.—*Mrs. C. W. Alley*

CHERRY DESSERT

1 quart cherries
½ cup shortening
1 cup flour
1 teaspoon baking powder
½ cup sugar
¼ teaspoon salt
Milk

Place cherries in a baking dish. Mix 2 tablespoons flour and ½ cup sugar and stir into fruit. In another bowl mix flour, sugar, salt, baking powder, and shortening. Moisten with milk to form soft dough. Pat out on slightly floured board. Place dough over fruit. Bake at 375° F. for about 45 minutes.—*Mrs. Henry C. Bendt*

WAITING IN A PRETTY WAY

You'll want to look your prettiest during your waiting days. That's when it's time to pick crisp, bright fabrics that give you color and sparkle. Make a basic skirt in serviceable lightweight black wool and top it with feminine jackets and blouses. For an extra partying ensemble, use the same skirt pattern and create a boatneck blouse in a matching dressy fabric. The four jacket and blouse designs with the skirt are contained in Advance Pattern 6158. Sizes 12 to 18. Price 35 cents.

Send order and cash for patterns to Pattern Department, American Fruit Grower, Willoughby, Ohio. Be sure to specify size. Print name and address clearly.

American Fruit Grower

RICHARD T. MEISTER, *Editor*
H. B. TUKEY, *Associate Editor*

• *Fruit for Health* •

The Chemical Revolution

NO ONE can read this issue of AMERICAN FRUIT GROWER, devoted as it is to the topic of growth regulators, without being impressed by the chemical revolution that is occurring in agriculture.

The story begins with the basic chemical fertilizers of crop production—nitrogen, phosphorus, and potassium. To these now must be added calcium, magnesium, manganese, iron, zinc, copper, boron, and a few others like cobalt and molybdenum which are occasionally being heard of.

A crude, gross treatment of the topic of fertilizers no longer satisfies; all of the details and refinements of base exchange, availability, balance, deficiencies, and what not, must now be included. Where nitrogen until recently was the single fertilizer for fruit, the trend is towards fertilizer ratios of 1-1-1 plus minor elements.

But the real excitement has come in the new organic insecticides and fungicides. Already a generation has arisen which has forgotten the scourge of the codling moth, conquered by DDT. Other materials are lindane, chlordane, heptachlor, dieldrin, parathion, TEPP, and HETP among insecticides; and parzate, dithane, ferbam, zerlate, quinones, captan, glyoxalidines, and organo-mercuri compounds to mention only a few among fungicides. Compare this with the copper, sulfur, and lead arsenate program that bound the fruit industry for so many years.

Now come growth regulators, which in minute amounts produce such profound effects on plants. We stick blossoms on, we take blossoms off, we prevent preharvest fruit drop, we hasten maturity, we delay maturity, we hasten rooting, we prevent sprouting, we control the pineapple from the cradle to the grave.

All of this is the natural evolution of fruit growing, making the industry less a game of chance, folklore, superstition, and green thumb and more a scientific, factual business endeavor.

As we said in a previous editorial, the plant is still the basis of the industry, but little by little we are learning the how and the why of plant behavior and how to control the situation. Some day when history is written these facts will be pointed up. They will stand out like other great revolutions.

We should take just a moment in our busy lives to pause and realize the tremendous impact of chemicals in a chemical age. And we should appreciate the fact that we are witnesses to a great page in history.

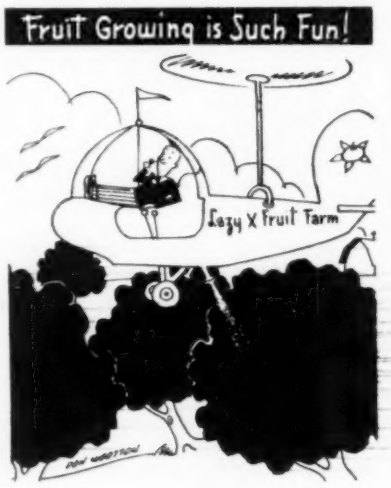
A Living Museum of Old Varieties

PERHAPS it is a nostalgic feeling that prompts readers to ask where some of the old-time apple varieties can be obtained—planting stock of such varieties as the Astrachan, Russets, and Pippins. Yet there may be some truth in the idea that present-day varieties lack the flavor and quality of many of the early varieties.

Now word reaches us that an experimental orchard is being established in Massachusetts for the purpose of perpetuating worth-while old apple varieties. The article on page 30 lists the varieties which will be included in this orchard.

Here truly is a living museum for posterity for not only will the old-time varieties be used for educational and breeding purposes but scions will be available to interested persons.

The long ribbons of highway which pattern our landscape have increased tremendously the roadside sale of fruit and it is easy to foresee that the old flavorful varieties may again become available to satisfy our inner yearning.



Fruit Talk

A group of prominent **English** growers who oppose a marketing scheme for apples and pears say, "It will lead to a substantial levee on producers and a multiplication of form filling and market inspectors and snoopers with powers of entry far exceeding those granted to the police." Nicely and effectively worded!

Frozen fruit dealers rank consumer demand in this order: 1) strawberry, 2) raspberry, 3) peach, 4) cherry and rhubarb, and 5) pineapple.

Heavy hydrogen, which is related to the hydrogen bomb, is found in higher than usual amounts in willow wood, and twice this amount in the sap. Honey also has been found to be rich in heavy hydrogen.

According to **Stanley Johnston,** South Haven, Mich., the best standard varieties of **blueberries** are Jersey and Rubel; promising, Berkeley, Earliblue, and Bluecrop; limited, Coville, Burlington; obsolete, Weymouth, June, Cabot, Adams, Rancocas, Harding, Pioneer, Concord, Stanley, Atlantic, Pemberton, and Dixie.

Since so much material is now being handled in quantity on **pallets** with **fork lifts,** a new "non-skid coating" for large paper containers guarantees a "42-degree angle" before the whole pile slides!

Sunkist has found that **lemon juice** is a powerful natural and economical antioxidant for frozen fish.

Lyle H. Davis of Blacksburg, Va., has prepared a helpful abstract of recent research of factors influencing quality of apples, juice, and processed fruit products.

Two attractive new **publications** from the **Vineland Station,** Ont. (each with a color-plate cover), are Bulletin 487, "The Grape in Ontario" and Bulletin 494, "Nut Culture in Ontario."

Here is a quick appraisal of the **American apple industry** by a foreign visitor: "The American grower will say to his research station, 'Find me an apple that is full of eye appeal, is hard, and travels well.' In time the research station produces such an apple, which is then planted on a large scale and eventually finds its way to market. But the American public wants flavor as well. Because of this the apple industry is in a rather sorry plight and is losing ground to citrus fruit."

Once again **science** corroborates a folk tale and general belief that **frosts** are associated with a cold, full moon. Herbert Hemstock of North Wales finds that there is a fall in minimum night temperature at or near full moon, and that this fall is greater in the winter than in the summer.

Report of the **13th International Horticultural Congress** will be available shortly for $6.50 per set of two volumes, post free, from the Royal Horticultural Society, Vincent Square, London, S.W.1, England.

—H.B.T.

Coming Next Month

- Orchard Practices to Conserve Water
- Technique of Sprinkler Irrigation
- Irrigation Equipment and Rated Capacities
- Legal Problems in Water Supply
- The Growth of Humid Area Irrigation
- Western Conservation and Reclamation Projects

(Continuation of standard equipment and trim illustrated is dependent on availability of material.)

How Chevrolet Trucks can cut costs on your farm . . .

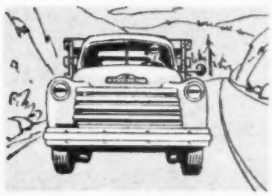
CHEVROLET There are plenty of good, sound reasons why 1953 Chevrolet trucks will do more work for you at a lower over-all cost.

To name just a few: With Chevrolet you get the *right* truck for your job. They are factory-matched to the work they will do.

Then, too, these great Chevrolet advance-design trucks *list for less than any other truck of comparable size, capacity and specifications!*

Add the gas-and-oil economy for which Chevrolet is widely known and there is just one conclusion: Chevrolet trucks are built to do more work for less money.

So, before you buy *any* truck, let your Chevrolet dealer show you how 1953 Chevrolet trucks can cut your costs. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.



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High-compression Loadmaster engine in heavy-duty models delivers more power on less gas. Thriftmaster engine is famous for economy.

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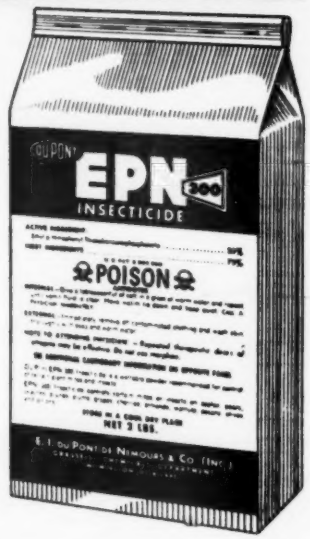
time *labor* *equipment* *materials*

WITH DU PONT EPN

TO CONTROL MITES AND INSECTS



NOW you can get higher efficiency in your orchard spray program by using EPN 300 insecticide to control important insect pests as well as mites. One application provides thorough contact kill of major mite and insect pests of many fruits. And residual control is so good that you usually need fewer applications.

KILLS THESE MITES: European red mite, Two-spotted mite, Pacific mite, Willamette mite, Schoene mite, Red spider, certain citrus mites.

KILLS THESE INSECTS: Oriental fruit moth, plum curculio, peach tree borer, lesser peach tree borer, pear psylla, fruit tree leafroller, grape berry moth, codling moth, orange tortrix and other orange worms, walnut aphid, bud moth, pecan nut casebearer, certain scale insect crawlers.

USE EPN ON THESE FRUIT CROPS: Apples (except McIntosh-type varieties), pears, peaches, apricots, plums and prunes, grapes, cherries, walnuts, almonds, pecans, citrus and olives.

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*REG. U.S. PAT. OFF.

On all chemicals always follow directions for application. Where warning or caution statements on use of the product are given, read them carefully.

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